ENGINEERING NEWS-RECORD

AUG. 8, 1957

PRICE 50 CENTS

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Torch opens up Baltimore tube sections p. 38

A McGRAW-HILL PUBLICATION

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LANSING MICH 13

STANDARD HERSEY DRYERS...

solve Sludge Disposal problem

FOR Corpus Christi

STANDARD STEEL'S PUSH BUTTON PLANT SAVES SPACE, PRODUCES A MORE SALEABLE PRODUCT AND OPERATES MORE EFFICIENTLY AT HALF THE ORIGINAL COST OF OLDER CONVENTIONAL DRYERS. The equipment is compact... the original investment is lower by nearly one-half than for older style dryers... the operation can come on-stream quickly and easily and can be shutdown just as smoothly...these are a few reasons why more and more cities and municipalities are taking a close look at STANDARD-HERSEY Rotary Dryers.

The installation at Corpus Christi, Texas is a good example of the efficient all-weather, economical operation possible using Standard Rotary Dryers for handling sludge. Each of the two dryers installed there has a normal capacity of more than 1 ton of sludge per hour. Abrasion in duct work is much less with rotary dryers because of the lower speed of travel of sludge and because the sludge is not smashed into a powder and forced into a swift air stream. A saleable product of uniform particle size and non-dusting quality is the result of the gentler treatment in rotary dryers.

Investigate the many other advantages of this system for handling sludge and industrial wastes... write for more details.

PUSH BUTTON OPERATION!

Every Standard-Hersey installation is under the complete control of a central control board. The operation is simple to understand—to operate.

STANDARD STEEL CORPORATION

General Offices and Factory, 5093 Boyle Avenue, Los Angeles 58, California

LEADER IRON WORKS

(Division of Standard Steel Corporation)
Midwest Offices and Factory, Decatur 93, Illinois

ROTARY DRYERS • KILNS • COOLERS • ASPHALT PLANTS

STANDARD HERSEY DRYERS

Riddle Quarries Cut Costs with

MURPHY DIESEL POWER

"70% lower maintenance
15% lower fuel costs
12% higher production"
says JOHN H. RIDDLE

Murphy Diesel's ability to cut maintenance and fuel costs, and help increase production, is an important item on any construction job. *But that's not all John Riddle likes about his Murphys!*

"We purchased Murphy," he says, "because our experience with some second-hand, smaller Murphy engines demonstrated that Murphy starts easier, runs cooler, delivers steadier, more uniform power at more economical operation costs, with added reserve for excess demands. We found this engine to be free of ordinary breakdowns, and capable of delivering long, trouble-free service even through 20-hour shifts."

Riddle Quarries, of Salina, Kansas, has 4 shovels, 3 secondary and 1 jaw crusher primary plant, all powered by Murphy.

Ask your Murphy Dealer about the advantages of Murphy power on your job.

Four of Riddle Quarries' 8 Murphy Diesels power both shovels and the portable primary and secondary plants used to furnish blanket and rip rap material to the U. S. Bureau of Reclamation on the Lovewell Dam.

377N

MURPHY DIESEL

HEAVY-DUTY POWER for Construction

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

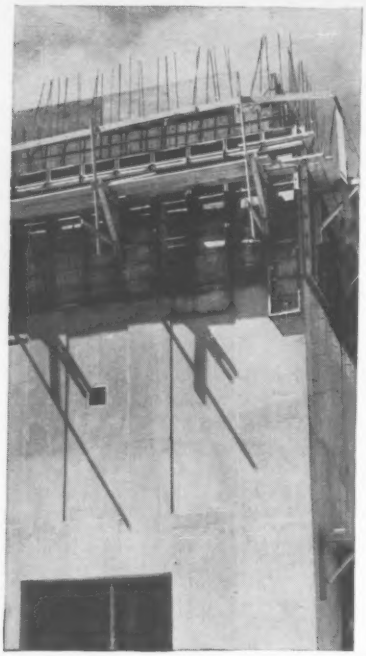
MURPHY DIESEL COMPANY

5321 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

Symons FIELD REPORT...



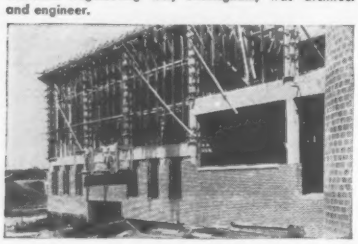
Walls, Slabs, Beams and Stairways Formed with SYMONS FORMS

8,500 square feet of Symons Forms with steel cross members, 200 column clamps and 520 shores were used by Sullivan Long and Hagerty, Birmingham, Alabama, for construction of the new $6,000,000 Jefferson County (Birmingham), Alabama, sewage treatment plant, vacuum filtration and flash drying building, and six digester tanks. The bin section of the plant is 60 feet high.

Forms were leap-frogged for successive lifts on the walls. Large pieces of plywood were attached to the face of the forms to form the recesses on the bin. Forms were also used for forming slabs, beams and stairways. Slab thickness ranged from five to seven inches and Symons 8-foot shores with 8-foot extensions on four foot centers were used to hold the slabs 23 feet high.

Symons Forms may be rented with purchase option. Symons Clamp & Mfg. Co., 4265 Diversey Avenue, Dept. H-7, Chicago 39, Illinois.

Sewage treatment plant has capacity of 40,000,000 gallons daily and serves an area of 610,000 population. Goodwin Engineering Co., Birmingham, was architect and engineer.



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FORMS—CLAMPS—SHORES
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EIGHTY-THIRD YEAR OF PUBLICATION

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For those HEAVIER JOBS!

Have you seen the new Northwest 35-ton Truck Crane? The big 41 TC in the illustration is handling heavy barge sections for assembly on a bridge job in Holland, Michigan for Brown Bros., of Lansing. If you are considering high-capacity, rubber-tired crane equipment you should see this Northwest before you buy.

It's smooth in operation. The Northwest Independent High Speed Boom Hoist gives you boom control the like of which you have never experienced before. It is power controlled both up and down and it operates independently of any other machine function without sacrificing either of the main hoist drums.

Removable counterweight makes the reduction of gross weight a matter of minutes and pivoted gantries are quickly raised and lowered under power for clearance.

The "Feather-Touch" Clutch Control assures ease of operation and gives the *feel of the load* without resorting to pumps, compressors, valves, tubing and other delicate mechanisms. Add to this a dozen other advantages that help you make money, many of them standard equipment. It is a high capacity, mobile package of lifting power.

And the carrier, remember, is Northwest designed —built to Northwest specifications for crane service and tested for 35 ton Crane capacity. It incorporates Northwest features found in no other carrier.

Here is a combination that gives you the best in mobility and crane ability. See it! Ask about it!

NORTHWEST ENGINEERING COMPANY
1502 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

BUILT IN TWO SIZES
25 TON AND 35 TON

THE GREATEST COMBINATION OF PROVED ADVANTAGES EVER BUILT INTO A SHOVEL, CRANE, DRAGLINE OR PULLSHOVEL

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES

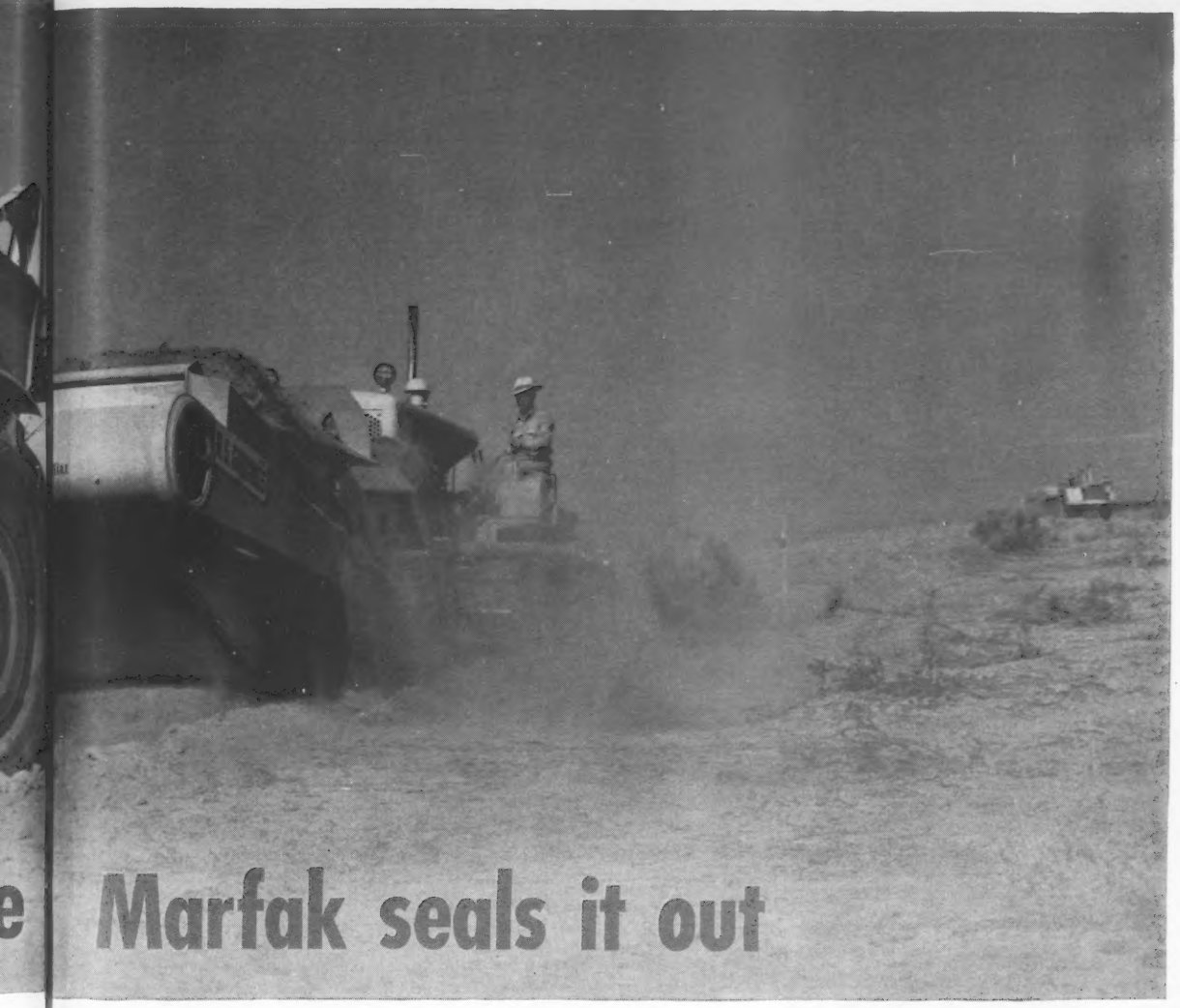
No dirt in bearings because

The most effective way to keep abrasive dirt out of your wheel bearings is to use *Texaco Marfak Heavy Duty 2*. It is designed specifically for wheel bearings and actually seals itself in, and stays in, through the heaviest service and highest temperatures. It gives you longer bearing life, and extra thousands of miles between repackings.

For chassis lubrication, *Texaco Marfak* has the same "sealing in" action. It keeps out dirt and moisture to give top protection against wear and rust. And it won't jar out, pound out, or squeeze out. In fact, *Texaco Marfak* has proven so successful that *over 650,000,000 pounds of it have been sold!*

If you prefer an all-purpose lubricant, your choice would be *Texaco Marfak Heavy Duty*

TEXACO



Marfak seals it out

Special 2. It pumps easily and handles all grease lubrication regardless of temperature.

To get the same effective protection for crawler mechanisms, use *Texaco Track Roll Lubricant*. For differentials, specify *Texaco Universal Gear Lubricant EP*.

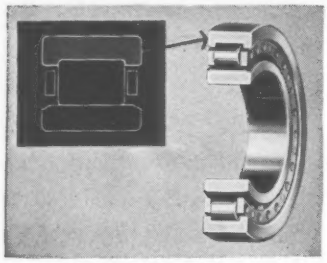
Ask a Texaco Lubrication Engineer to do these two things for you: (1) give you details on how Texaco lubricants can help you, and (2) work out a Texaco Simplified Lubrication Plan for your job—it lets you handle all major lubrication with no more than 6 Texaco products. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Loggers' "weight-lifter" tests bearing stamina!



TWO-LIP RACE INCREASES RIGIDITY

Two parallel shoulders made integral with the outer race, as shown in gray above, increase rigidity and durability —keep rollers in proper alignment. Precision-ground rollers and races give quieter, smoother operation.

Tossing around logs 6 feet in diameter like toothpicks is no job for a softie! This machine has to be *built* for it right from the start—*right down to the bearings.* And that goes, too, for the trucks which haul these back-breaking giants over the most rugged terrain. Bower tapered and straight roller bearings have been *engineered* for just such work as this—to last longer, perform better under any road or load condition. Painstaking quality control plus basic bearing design refinements—like those shown at left—have reduced Bower Bearing failure to a practical minimum. *Whatever* your product, if it uses bearings, specify Bower! There's a complete line of tapered, straight and journal roller bearings for every field of transportation and industry.

BOWER ROLLER BEARING DIVISION
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BOWER ROLLER BEARINGS

ROAD-BUILDING VETERAN PROVES

BEST EQUIPMENT, WELL MAINTAINED, PAYS OFF BEST

GOODYEAR IS THERE!

▲ MILLION-DOLLAR ARRAY of equipment like this takes $7,000,000 relocation job on U. S. 21 in stride. This is just one of the many highway and airport grading and paving projects in Frank Mashuda Company's long and successful history. Tires shown are wide-base Hard Rock Lug by Goodyear.

◀ TYPICAL ON-JOB SETUP includes huge Quonset maintenance center and 2-way radio facilities. All vehicles and tires are kept in A-1 working condition at all times, on every job—and when no longer needed are returned to central maintenance center for general inspection and reconditioning. This has paid off, through the years, in one of the lowest down-time overheads in the industry.

80% of earth-mover tire down time ended by Goodyear

Other 3-T Nylon Cord Tires—
Tubeless or Tube-Type!

ALL-WEATHER EARTHMOVER

HARD ROCK LUG

HARD ROCK RIB

SURE-GRIP LUG

ROAD LUG

GOODYEAR TIRES

Look for this nearby Goodyear dealer sign for better tire values—better tire care.

3-T Cord TUBELESS!

CONTRACTORS REPORT that as much as 80% of tire down time is due to tube and flap troubles.

Goodyear TUBELESS tires and rims end all that—end high cost of tube replacement—and give you other important advantages:

Goodyear tubeless assemblies are *tops* in dependability, *tops* in easy mounting, save weight and run cooler. You often discover tire injuries *before* they become serious, repairs are simpler and can frequently be made *without removing tire!* As a result, tire failures hit all-time LOWS!

Be sure you specify GOODYEAR triple-tempered TRIPLE-TOUGH 3-T CORD TUBELESS for every size new equipment—and see GOODYEAR dealers for change-over of present vehicles.

Goodyear, Truck Tire Dept., Akron 16, Ohio.

Buy and Specify

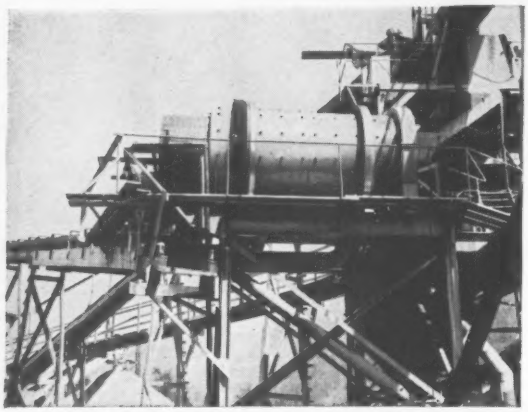
GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

All-Weather, Road Lug, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

at ASSOCIATED SAND & GRAVEL CO. PLANT, Baker Dam, Washington

Scrubbing was a problem—

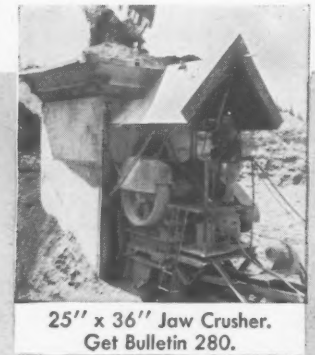


TELSMITH
84″ Super-Scrubber
solved it!

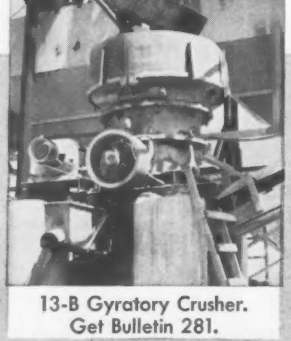
About 1,200,000 tons of concrete aggregates, in 5 sizes, for Baker Dam—and the Associated Sand & Gravel Co. plant at Concrete, Washington, working on extremely coarse pit material abounding in clay. What a scrubbing problem! But its Telsmith 84″ Super-Scrubber easily handles a plus ¼″ minus 6″ feed of gravel with a heavy sandy-clay coating—turning out as high as 150 cu. yds. per hour—with the product so clean it looks hand-scrubbed. And, these gravel particles are *not* round, but angular, with crevices. Still all the clay is removed by the Telsmith Super-Scrubber! (Bulletin 292 tells how). Plant production is 285-325 cu. yds. hourly of concrete sand, plus ¼″ minus ¾″, plus ¾″ minus 1½″, plus 1½″ minus 3″, and 3″ minus 6″ gravel. (Send for Bulletin 266.)

OTHER TELSMITH EQUIPMENT IN THIS PLANT

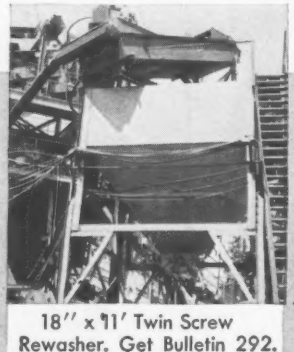
G-27



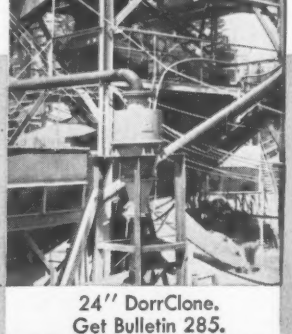
25″ x 36″ Jaw Crusher. Get Bulletin 280.



13-B Gyratory Crusher. Get Bulletin 281.



18″ x 11′ Twin Screw Rewasher. Get Bulletin 292.



24″ DorrClone. Get Bulletin 285.

SMITH ENGINEERING WORKS

500 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

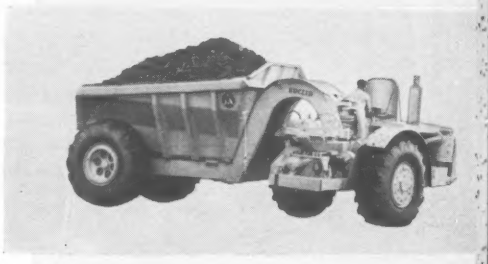
NOW TORQMATIC DRIVE boosts S-7 performance

See your Euclid dealer for more details on this improved S-7 as well as the complete line of "Euc" Scrapers from 9 to 32 yds. heaped.

EVER SINCE it was first introduced the Model S-7 Euclid Scraper has been a top performer and profit maker for owners. Now it's available with 4-speed Torqmatic Drive, a new Torsilastic seat for greater operator comfort, and an improved hydraulic system that provides easier steering and is independent of other scraper operations.

With these new improvements the S-7 is a more productive machine than ever—here are some of the reasons why:

- **Faster loading** because the 4-speed Torqmatic matches engine power to job requirements—provides greater power in the loading ranges to get heaped loads of 9 yds. in a hurry.
- **Faster cycle time** because changes from one speed range to another are made under full power with no loss of momentum—operator can maintain higher average travel speed.
- **Lower costs** because Torqmatic has cushioning effect on entire power train—reduces downtime and maintenance expense.
- **Easier operation** because new Torsilastic seat absorbs road shocks, thus reducing driver fatigue—improved hydraulic system results in easier smoother steering—elimination of manual shifting makes good operators out of mediocre ones.



MORE VERSATILITY at minimum investment . . . a 10-ton rear-dump body is interchangeable with scraper bowl for work where rock and heavy excavation must be moved and where close quarter loading and dumping conditions prevail.

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

In carrier landings, planes coming in at more than 100 knots are stopped in a split second. This amazing performance is made possible by having each plane hook onto one of several wire ropes stretched across the flight deck. Both plane and rope receive an almost unbelievable shock at the moment of contact. Needless to say, only top-quality wire ropes can be used for this application because . . .

you can't bargain with safety

While your use of wire rope differs from this carrier application, *safety should be just as important to you.* For, although a "bargain" rope may save you money, it can cost you your peace of mind. So don't bargain with safety. Buy a rope that's a *quality* rope—buy Wickwire Rope. 5049

WICKWIRE ROPE — A CF&I PRODUCT

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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Reader Comment

CANTILEVER BRIDGE over the Hudson River on the New York Thruway—would a suspension design have been less costly?

Suspension Design Is Best

SIR—Your article, "This Design Beat U. S. Firms," is of special interest to me. In 1950, I worked out a design similar to that of the Lake Maracaibo Bridge shown in ENR June 13, p. 28, for the New York Thruway, Tarrytown-Nyack, Hudson River Bridge, and also others, including one with three diagonal cables, which I found to be more economical. The economy of the suspension design I determined by comparison of the maximum cable tensions, girder compressions and moments with the stresses and moments in a continuous truss. In addition, this system is adaptable for economical erection.

I offered my designs on Dec. 11, 1950, indicating that the cost of the proposed arch bridge may be prohibitive because of erection considerations. ENR reported two years later (Dec. 25, 1952) that because of the "inability of the companies to meet the state's estimated cost", the arch design was abandoned.

A conventional cantilever truss bridge was built. The 93 ft span overhead bracings of this cantilever truss span represent great economic disadvantage in cost and maintenance expenses, also in appearance, as proved by my designs.

There is nothing new about the design that beat U. S. firms. It was built previously in reinforced concrete with encased cables, for a 187 ft span, by Eduardo Torroja in Spain in 1926. It was proposed before this application for a Neckar River Bridge in 1925, with a 313 ft span, and for two Rhine River bridges in 1949 and 1952 with a 1,033 ft and a 937 ft center span, respectively. The latter bridge had 26 ft deep trusses and structural steel cables. A 193 ft span was built in Germany recently.

I made several designs of this type for other bridges. Among these are one in 1945 with a 450 ft span and structural steel cables, and more recently, two designs for double-deck bridges in the 1,000 ft span range, with cable arrangement similar to that of the 599 ft span of the Strömsund Bridge, which was built in Sweden in 1955. These also indicated advantages over conventional cantilever truss designs.

LOUIS BALOG
Consulting Engineer
Binghamton, N. Y.

Surety Bonds

SIR—On the subject of subcontractor bonds under the Miller Act (ENR June 20, p. 8), it seems to me that anybody who reads the Miller Act, Title 40, U.S.C.A., Section 270a, can see for himself that there is no requirement whatever for any subcontractor to furnish a surety bond. The reason is simple, namely, that no subcontractor under the Miller Act has privity with the government. The provisions in Section 270b for the benefit of the subcontractor's unpaid suppliers beat this out.

The court, in the Osceola case, may have intended to say that the subcontractor furnished a performance bond of a tenor similar to those terms and provisions which the Miller Act requires—not that the Miller Act required such a bond.

H. W. RUDOLPH
Seaboard Surety Company
New York, N. Y.

EDITOR'S NOTE—Below is the reply of I. Vernon Werbin, who summarizes court decisions for ENR's Legal Column.

SIR—On further examination, the court's statement in the Osceola case that a subcontractor furnished a pay-

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NEED A LOW-COST BUILDING FAST?

Steelcraft standard steel buildings can meet your needs faster and at less cost than any other type of construction. Predesigned rigid frame and truss type structures can be delivered very quickly. Structural members are mass produced to factory standards . . . pre-engineered for fast, low cost field assembly with a relatively small work crew. Your Steelcraft dealer, who provides complete construction service, can erect your building in a matter of *weeks* instead of months. You quickly and *profitably* get full use of your new facilities.

Steelcraft features give you more for your money!

- Select any width, height or length, with spans up to 80 feet . . . choice of wall and roof materials, doors, windows, skylights
- Easily, economically insulated to your requirements
- Effectively combined with other construction materials
- Provisions made for inexpensive future expansion

SEND FOR NEW 20-PAGE CATALOG

describing building types, construction details, and applications

THE STEELCRAFT MANUFACTURING COMPANY
9017 BLUE ASH RD. DEPT. 28E
CINCINNATI 42, OHIO

I want to find out how to build at *less cost, faster, better.*

Rush me your new catalog of STEELCRAFT STANDARD STEEL BUILDINGS.

NAME_____
CO._____
ST._____
CITY_____ STATE_____

WHY DESIGNERS SPECIFY JUNIOR

1. AVAILABILITY

Identified projects, designed for JUNIOR BEAM construction, are assured of a reliable source of supply by Jones & Laughlin. JUNIOR BEAMS, in 6″, 8″, 10″ and 12″ sizes, are produced to fit your needs . . . with delivery when you need them. When you build with JUNIOR BEAMS you eliminate costly delays in procurement and fabrication.

2. VERSATILITY

The versatility of JUNIOR BEAMS is illustrated in this grandstand where they are used as floor beams, purlins, stair risers and in built-up columns by Holston Steel Structures, Inc., Bristol, Tennessee. JUNIOR BEAMS can be used in a wide range of cost-cutting applications, such as floor and roof construction, shipbuilding, truck and trailer frames.

3.

Contr
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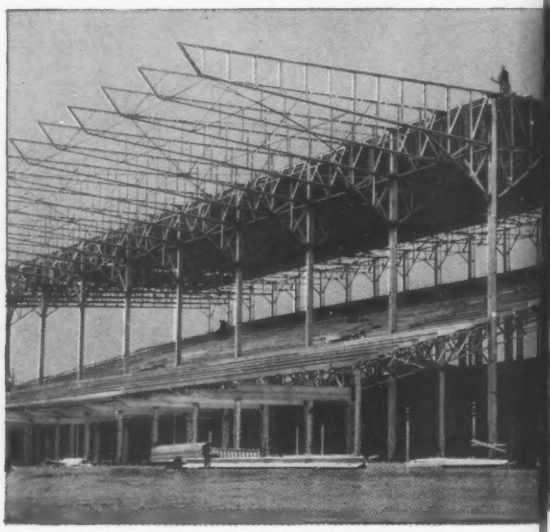


JUNIOR BEAMS offer extreme versatility for use in residential and industrial construction, schools, hospitals, commercial buildings. JUNIOR CHANNELS, for stairway construction, and JUNIOR BEAMS are available from the mill and from principal fabricators and warehouses. Investigate the many advantages of these two hot-rolled structurals today.

J&L STEEL

Jo

...

BEAMS

3. ECONOMY

Contractor on this job saved 56 man-hours using JUNIOR BEAMS as floor joists. Floor construction was completed in 19 man-hours as compared to 75 man-hours for conventional wood joist construction by Steinkamp & Company, Batesville, Indiana. JUNIOR BEAMS are low in cost, light in weight, and easy to erect by welding or bolting for all types of construction.

4. MODERN APPEARANCE

Exposed JUNIOR BEAMS permit added height in this modern home of J. Leonard Rush, Detroit architect. These JUNIOR BEAMS were used on a 30-foot span, allowing for unusual design features. The roof is supported by the JUNIOR BEAMS on three-inch diameter steel pipe columns. Costs for this type of roof were only half the cost of wood-frame construction.

Simply mail this coupon for additional information...

Jones & Laughlin

...a great name in steel

Jones & Laughlin Steel Corporation
Dept. 428, 3 Gateway Center
Pittsburgh 30, Pennsylvania

☐ Have representative call

☐ Send information on JUNIOR BEAMS and JUNIOR CHANNELS

Name_____

Title_____

Company_____

Street_____ City_____ State_____

This full-page advertisement appeared in full color in a recent issue of *The Saturday Evening Post*

THE GREATEST CONSTRUCTION JOB IN HISTORY HAS STARTED HERE

When the big earthmovers rolled into St. Charles, Mo., America began the monumental task of building 50 billion dollars' worth of highways in the next 14 years.

By 1971, the 2½ miles of divided four-lane highway being built near St. Charles, Mo., will be just a tiny segment of 41,000 miles of modern freeways crisscrossing the nation. But today it's something special. It is the first Interstate highway to be built under the new Federal-Aid Highway Act, which has unleashed the biggest building job ever conceived by man.

This is the beginning of the Interstate Highway System—a dream network of wide, safe freeways which will link all 48 states and serve over 90% of all our cities with 50,000 population or more.

The Interstate System is a state responsibility, even though the Federal government is paying 90% of the cost. The states worked out the routes. The states helped decide the standards. Each state will not only purchase the land for its part of the system, but decide what to build first, let contracts and supervise construction.

Missouri was ready to roll when the law was signed last June. Detailed plans were on hand. It had purchased the land for the St. Charles project. And most important, its laws permitted the land to be used for controlled-access roads. Those are roads without intersections. The entire Interstate System will be built that way, a move expected to stop 3500 traffic fatalities a year! And you'll be able to drive across the nation without a stop light.

Sounds good? Then support the plans of your state highway department. For your state may need more money to pay its share of this gigantic program. Or it may need up-to-date laws to acquire land. Your reward will be the largest, most modern highway system in history.

WHAT EVERY CITIZEN SHOULD KNOW ABOUT THE GREATEST CONSTRUCTION JOB

Will the new Interstate System serve your town? When will it be finished? How much is it costing you? You'll be proud of your nation when you get all the facts in the free booklet, "The Road Ahead." Write today to Dept. 2, Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

THE WORLD'S NO. 1
ROAD BUILDING EQUIPMENT

BIG LIFT

for a $50 billion job

One year ago this month a fleet of CAT* machines tore into the earth along Route 40 near St. Charles, Mo.—and the building of this nation's spectacular Interstate Highway System began.

Today, work on this 41,000-mile network of expressways—part of a 50-billion-dollar road program—moves ahead. It's getting a big lift from Caterpillar . . . in two ways that work directly to your advantage:

(1) **Caterpillar national advertising** is supporting this tremendous project in the best way possible: by explaining it to millions of citizens, by pointing out in informative messages exactly what the program encompasses, what it will mean to everyone, ways to keep it moving.

The one roadblock still in the path of our large-scale Federal-aid program is public misunderstanding. An undertaking so immense could bog down unless an interested and enlightened citizenry keeps it on the track. In a new series of full-page four-color advertisements—like the sample on the opposite page—Caterpillar is helping in this important task of public education. For seven years it was Caterpillar advertising which helped mold opinion in favor of the new public roads; today Caterpillar advertising takes on the burden of keeping public opinion informed and alert, in promoting a project in which we are partners, and through which we all will profit.

(2) **Caterpillar equipment** is on the job all over the country, helping build our new expressways efficiently and economically. Caterpillar's intensive program of research and development has given you the most complete line of high-production, cost-cutting earthmoving machines in the world today. There are new and improved models all the way down the line: Tractors, Traxcavators*, Motor Graders, Scrapers and Wagons, Engines and Electric Sets. They're ready *now* to give you greater production, lower operating costs and surer profits in the big job ahead.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

Here is the booklet Caterpillar offers to readers of its national advertising. It contains *all* the latest information on the new highway program: when and where the money will be spent, standards for the new freeways, final routes of the Interstate System. It will be useful in your business — it tells you everything you need to know to share in the greatest construction job in history. Send for your free copies today.

Dept. ENR-8, Caterpillar Tractor Co., Peoria, Ill.

Please send me immediately ..... copies of "The Road Ahead."

Name.....

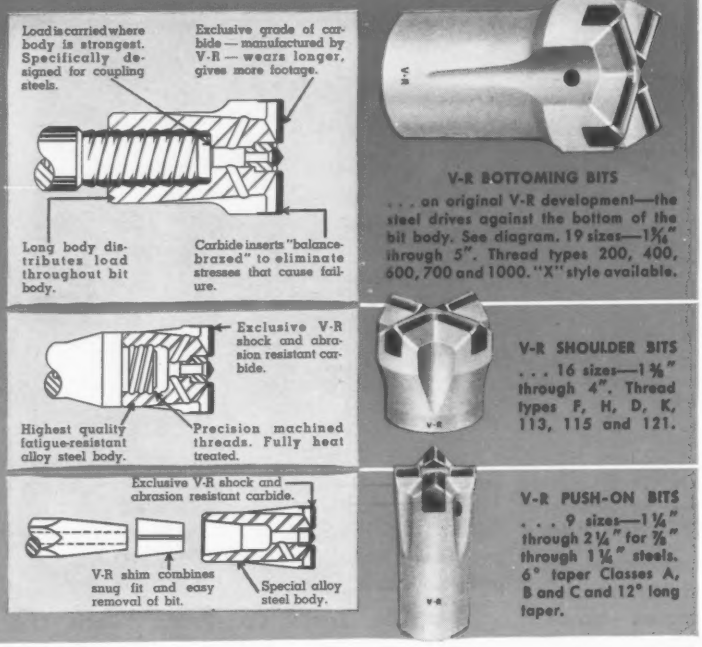
Company.....

Address.....

City..... Zone..... State.....

V-R Bits...

drill more on any job!


Load is carried where body is strongest. Specifically designed for coupling steels.
Exclusive grade of carbide — manufactured by V-R — wears longer, gives more footage.
Long body distributes load throughout bit body.
Carbide inserts "balance-brazed" to eliminate stresses that cause failure.
V-R BOTTOMING BITS . . . an original V-R development—the steel drives against the bottom of the bit body. See diagram. 19 sizes—1 13/16" through 5". Thread types 200, 400, 600, 700 and 1000. "X" style available.
Exclusive V-R shock and abrasion resistant carbide.
Highest quality fatigue-resistant alloy steel body.
Precision machined threads. Fully heat treated.
V-R SHOULDER BITS . . . 16 sizes—1 3/8" through 4". Thread types F, H, D, K, 113, 115 and 121.
Exclusive V-R shock and abrasion resistant carbide.
V-R shim combines snug fit and easy removal of bit.
Special alloy steel body.
V-R PUSH-ON BITS . . . 9 sizes—1 1/4" through 2 1/4" for 7/8" through 1 1/4" steels. 6° taper Classes A, B and C and 12° long taper.

Wherever there is rock, V-R Bits are building a reputation for fast, low cost drilling. There are good reasons:

Exclusive Carbide Grades. Since 1930, Vascoloy-Ramet Corporation has been a recognized leader in the manufacture of cemented carbides for severe wear applications. The carbide in V-R Bits is a recent, exclusive development providing exceptional impact and abrasion resistance.

Precision-Set Blanks. V-R carbide inserts are perfectly positioned in the bit body, preventing irregular stresses that shorten bit life.

Heavy-Duty Precision-Ground Bodies. Exclusive design, special non-fatiguing alloy steel, controlled heat treating, accurate threads and precision grinding produce V-R quality products.

Use the bits that are beating them all—V-R Bits!

ASK FOR CATALOG
—call your V-R representative or distributor, or write:

M-612

Vascoloy-Ramet Corporation
SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION
896 Market Street • Waukegan, Ill.

ment bond pursuant to the Miller Act is obviously incorrect.

The Miller Act contains no such requirement. In the Osceola case, the general contractor insisted the subcontractor furnish such payment bond to protect himself against having to pay suppliers of labor and materials after he had paid the subcontractor for the work.

I. VERNON WERBIN
New York, N. Y.

Name Incorrect

The S. S. Jacobs Co., Jacksonville, Fla, is the correct name of the general contractor who built the Southern Railway food terminal at Chattanooga. The article, "Building an All-Concrete Food Terminal," appeared in ENR June 20, p. 67, and the name was erroneously given as S. S. Jacobson. Simmerson & Bell, engineers for the project, are also from Jacksonville.

Asphalt or Concrete

In the article "How Do Electronics Scales Stack Up?" (ENR June 20, p. 39), a caption noting this type scale's usefulness in construction applications mentioned concrete batching while the photo was of an asphalt plant. Asphalt mixes, too, are being proportioned by electronic scales these days.

Right Man, Wrong Job

In an article appearing on p. 93 of its July 25 issue, ENR reported that George T. McDonald, retired executive secretary of the Georgia State Highway Board, had been appointed "director of the highway and heavy construction division of the Associated General Contractors of America."

Mr. McDonald, correctly has been named director of the division for the Georgia chapter of AGC, not for the national headquarters. Mr. James M. Sprouse is manager of the highway contractors division for AGC, with headquarters in Washington.

CALENDAR

Hydraulics Div., American Society of Civil Engineers, Kresge Auditorium, Massachusetts Institute of Technology, Cambridge, Mass., Aug. 26-28.

International Conference of Building Officials, annual business meeting, St. Francis Hotel, San Francisco, Calif., Sept. 13-15.

Building Research Institute's Plastics Study Group, Washington University, St. Louis, Mo., Sept. 17-18.

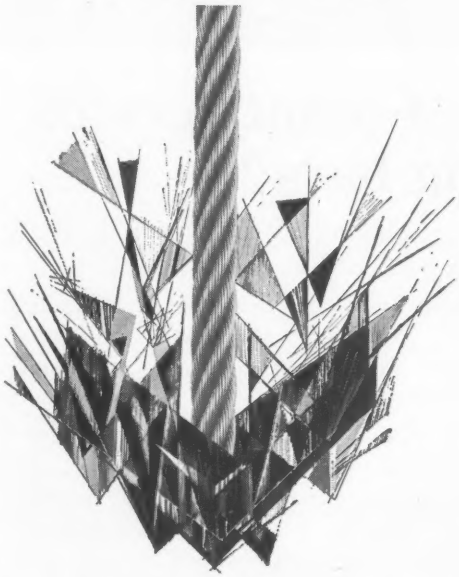
Public Works Congress and Equipment Show, American Public Works Association, Grand Exhibition Hall, Philadelphia, Pa., Sept. 22-25.

Federation of Sewage & Industrial Wastes Associations, Hotel Statler, Boston, Mass., Oct. 7-10.

Stands up to **bending fatigue**

Absorbs **shock** and **impact**

Has **higher strength**



Withstands **Abrasion**

These four qualities in Roebling Royal Blue Wire Rope mean **longer service life!**

They all add up to the fact that Roebling Royal Blue will deliver more work on your job—regardless of what it is. It's as simple and money-saving as that. For full information on Royal Blue, the rope that's stronger than yesterday's strongest, talk to your Roebling Distributor or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities—
Subsidiary of The Colorado Fuel and Iron Corporation

Chicago's two-level Wacker Drive is extended past post office, at left, for connection with Congress Street superhighway. Contractor: Herlihy Mid-Continent Company. Re-bars supplied by Ryerson.

Are you getting this 4-point service on reinforcing bars?

Pictured here is the Ryerson reinforcing products department where large stocks of Hi-Bond type bars are carried. Here the worker is signaling into place a lift of 60 ft. re-bars.

Contractors say there are four reasons why they keep coming back to Ryerson for rebars:

1. Tremendous stocks to supply any job, large or small.
2. Dependable fabricating service to meet the toughest, tightest schedules.
3. Setting plans and accurate bar identification to make placement quick and easy.
4. Deliveries always on schedule—to the day or even the hour you specify. Yet never too early, so that steel piles up on the site.

Contact your nearest Ryerson plant for a lump-sum or average-pound quotation on your next job. You'll save time and money, too, by ordering all your other construction steel requirements from Ryerson.

RYERSON STEEL

IN STOCK—Re-bars and Accessories • Spirals • Wire Mesh • Open Web Joists • Forms For Concrete Joists • Tubing • Structurals • Safety Plate • Stainless • Mansard Pattern Siding • Expanded Metal • Grating • Caisson Rings, Etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

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THE CONSTRUCTION WEEK

G.I. BUILDINGS TOO FRILLY—Spartan traditions in the armed forces are giving way to air conditioning, private baths and other high-priced refinements at the taxpayers' expense, complained a Congressional body this week. A House appropriations subcommittee deplored a creeping tendency toward the use of more expensive materials and fancy architecture for barracks, officers' clubs and other buildings. The group protested the increasing use of acoustical tile, fireplaces, hardwood dance floors, brick facing, and window canopies. Cited by the subcommittee were a $22,000 substitution of rubber tile for asphalt tile at Westover Air Force Base, Mass., and a $50,000 installation of ceramic tile wainscoting on the outside of concrete block barracks walls at Treasure Island Naval Base, Calif.

ALL SET FOR APPROPRIATIONS—Plans for a $180 million construction program for the 1957-58 fiscal year were worked out by 40 engineers and executives of the U. S. Bureau of Reclamation at a three day conference in San Francisco, Calif., last week. Reclamation Commissioner W. A. Dexheimer presided at the meeting, held annually by western reclamation officials to work out their construction schedule. Although their program is subject to final Congressional action on Reclamation Bureau appropriations, it is said to be flexible enough to suit the final price tag they expect Congress to fix.

HOW'S THAT AGAIN?—In two days of hot debate, the U. S. House of Representatives last week killed the idea of building a four-lane traffic tunnel across (that's what the bill said) the Potomac River, changed its mind, decided instead to build a six-lane bridge that would be "a fixed-span bascule" structure; then ordered that no tolls could be charged for the tunnel that isn't going to be built; and that access roads for the bridge that won't be built either may not be tunnelled under Arlington Cemetery. Looking at this handiwork on the second day, the House finally killed the whole business, and left matters where they stood originally—no bridge, no tunnel, no legislation.

SOME HELP, ANYWAY—The hard-pressed Arkansas Highway Commission, which last month announced it was too broke to pay its bills over the next few months (ENR July 25, p. 25) got a windfall last week, but still isn't out of the financial woods. The federal government speeded up its payments to the state, thus providing $1.5 million much before the state expected to get it. However, Arkansas needs $3 million to tide it over until October when revenues will start coming in again. Commissioners figured, however, that they could pay contractors in full a little longer than the previously announced cutoff date of August 15.

ACCO for Better Values

American Cable **TRU-LAY VHS** WIRE ROPE

15% STRONGER

VHS Dragline Stars in Alabama

Mr. C. A. Lee, Superintendent, Marigold Coals, Inc., Jasper, Alabama, says: "Our Page Model 625 Dragline is used to remove overburden averaging 36 feet of sandrock and blue slate in our strip mining operation. This is rough service. The best Improved Plow Steel Draglines we could formerly buy lasted only from 700 to 750 working hours.

"Now, however, we've switched to new TRU-LAY VHS and we are consistently averaging over 1400 hours. Because of this longer life, we've been able to cut the 'down time' of the dragline for wire rope replacement almost in half—which gives us big savings in increased production and lowered maintenance costs."

Stronger and Safer—New TRU-LAY VHS is made from a new grade of steel for wire rope. It is at least 15% stronger than Improved Plow Steel, the strongest grade formerly available. This means you can now handle heavier loads with the same diameter of line. And you get a higher factor of safety . . . more resistance to shock loads or sudden overstresses.

Tougher, More Wear Resistant—New VHS is tougher, too. It was developed especially for the toughest construction and mining applications—draglines, shovel hoist ropes, scraper and dozer cable. Since it resists abrasion and does not become "hidebound" or lose its flexibility, it lasts longer in these services.

Saves Money—The longer life you get with new TRU-LAY VHS saves you money. And even more important savings are often made through higher production or lowered maintenance costs, since the longer life of VHS reduces the "down time" of important equipment for wire rope replacement

At Your Distributor—Your American Cable distributor has a complete selection of draglines, shovel hoist ropes, slusher ropes and winch lines of new tougher VHS in stock now. You don't need any complicated specifications to order them. Just call him today and tell him the size and diameter you want.

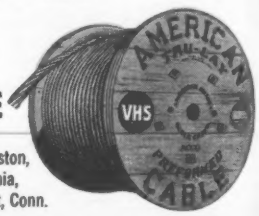
See your American Cable Distributor or write to the nearest American Chain & Cable Company Office

ACCO American Cable Division

AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.



WASHINGTON OBSERVER

- **Asphalt decision a year away**
- **Billions in construction still in Congress**
- **One new reclamation start approved**

● **Any new decision on the use of asphalt for military airport runways is at least a year away.** The Air Force, under pressure from the House Armed Services Committee, agreed to confer on the Army Engineer Corps' claim that it can work out a satisfactory design for asphalt for the central portion of runways for the heaviest bombers.

The Air Force insisted on a test of the Corps' specifications for this use before re-admitting asphalt to competitive bidding. The Air Force and the Army Engineers agreed to make the test on a runway under construction at the new Columbus, Miss., Air Force Base.

This runway won't be ready for testing until some time next spring. This means that the official decision on the reinstatement of asphalt isn't likely to be made until about a year from now. The House committee is holding off further hearings until the test is completed.

—

● **The last word on President Eisenhower's budget-cutting will come from some $10 billion of appropriations bills still to clear Congress**—including some of the biggest construction bills.

Public works, military construction, and atomic energy construction programs for the year that's already a month old are still snarled in one way or another—either behind jams caused by failure to pass authorization bills, or the Senate filibuster, or just plain GOP-Democratic politics.

Atomic energy construction is a good example. Here, AEC is trying to fight off a law which would require the agency to build and own power reactors. The Democrats originally plumped for a $400 million program; now they may force AEC agreement to a program running to $150-200 million. But the authorization bill for these still hasn't been passed.

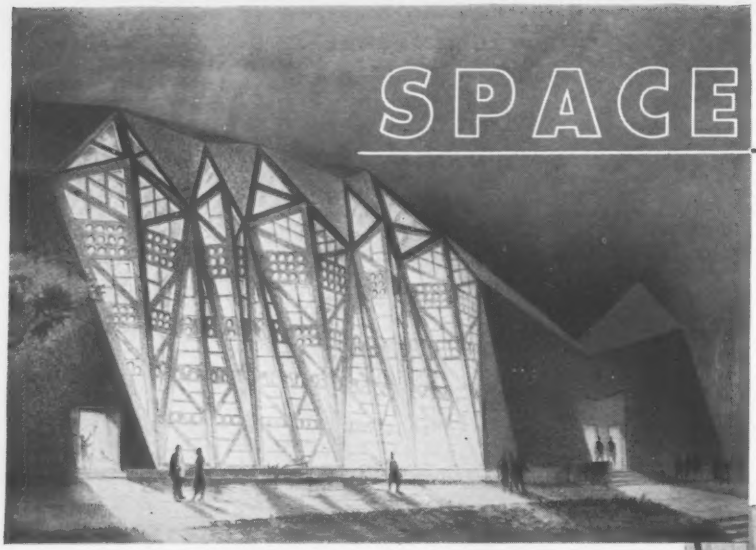
The military's request for $1.7 billion for its public works hadn't yet been reported out by the House committee as of early this week—and hearings haven't yet been completed by the Senate committee.

Rivers and harbors, flood control, and reclamation money is much closer to being approved. The House cut $62 million off the Administration's request for $876 million; but the Senate committee voted $8 million more than the Administration asked.

The foreign aid bill has construction in it, too—but it's difficult to specify just how much. The conference committee on the authorization bill will probably settle around $3.2 billion or so total; appropriation approval comes later.

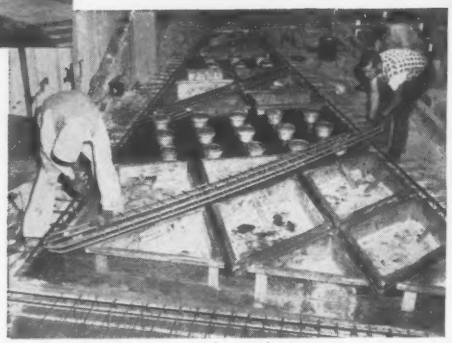
—

● **The only reclamation project to be approved so far by this Congress is the San Angelo project in west Texas.** Last week, the House voted to authorize the $32 million unit. The multipurpose project will provide municipal water for the City of San Angelo, irrigation and flood control. The combination of Texas drought and floods got this one through despite the Administration's "no new starts policy." Money won't be voted this year, however.



SPACE enclosed 'archi-structurally' makes this new church stand alone

Rendering shows giant abstract Biblical fish or whale form of church. Chancel, not shown, is at observer's left. Church is 234' long, 54' at its widest, and seats 670.



152 precast elements were used—80 triangles some perforated, others solid, and 72 solid quadrilateral panels—maximum sizes for panels 36 ft. x 10 ft.; for triangles 35 ft. on longest measure—maximum weights: for panels 10 tons; for triangles 5 tons.

Cathedral-Like Vastness Achieved by Wrapping Space in Pre-Cast Concrete

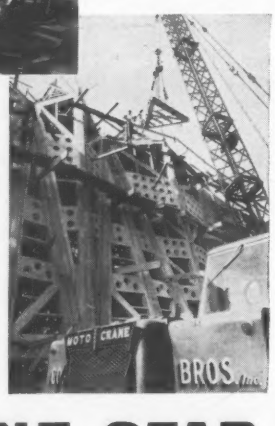
● Construction of the new First Presbyterian Church of Stamford, Conn. in which space is literally wrapped in precast concrete wall and roof elements that are self-supporting, without columns, beams or lintels can perhaps best be described as 'archi-structural' — the shell or frame being both structural and enclosing.

Reinforced concrete wall and roof elements, factory-fabricated to closest tolerances, were trucked to the job site. Panel bottoms were fastened to the footing, slanted panels being supported by false-work until roof panels were lowered into position, making the integrated wall and roof self-supporting. An eight-inch band of concrete connects the panels, resulting in a monolithic structure of great strength and rigidity.

The glass of inch thick amber, emerald and sapphire pieces was made in France from the templates of the triangular sections sent there for that purpose.

Dependable 'Incor'* high early strength, used throughout this job, makes possible assembly-line precision in casting . . . faster form re-use, maximum production with minimum form investment.

*Reg. U.S. Pat. Off.



Associated Architects:
HARRISON & ABRAMOVITZ
New York City
SHERWOOD, MILLS & SMITH
Stamford, Conn.

General Contractor:
THE DELUCA CONSTRUCTION COMPANY
Glenbrook, Conn.

Precast Sections:
PRECAST BUILDING SECTIONS, INC.
New Hyde Park, N. Y.

Consulting Engineer:
F. J. SAMUELY
London, England

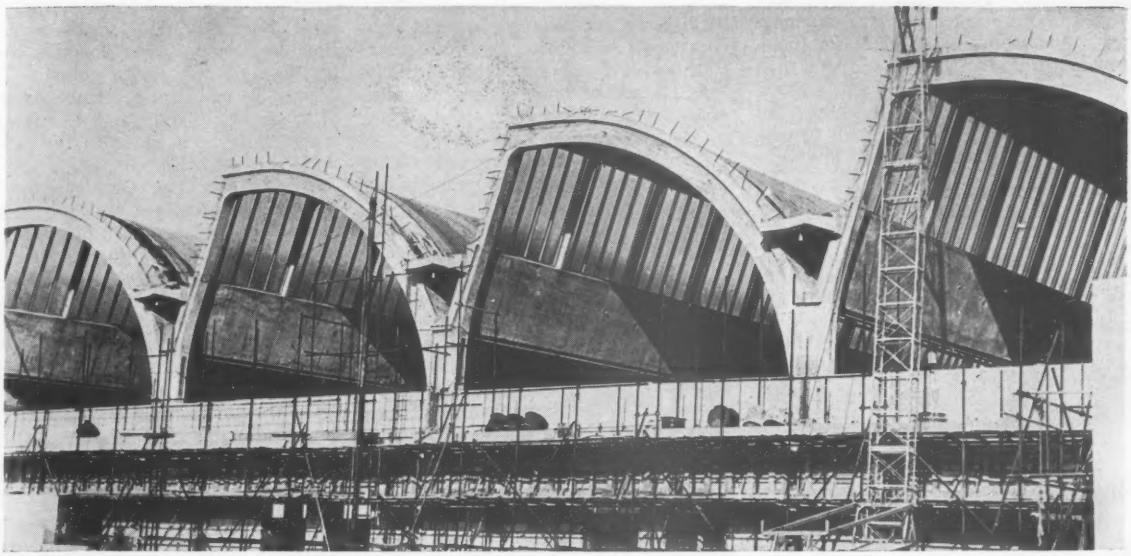
Structural Engineers:
EDWARDS & HJORTH
New York City

LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N. Y. • BETHLEHEM, PA. BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON INDIANAPOLIS • KANSAS CITY, MO. • LAKE CHARLES, LA. • NEW ORLEANS NEW YORK • NORFOLK • RICHMOND • SEATTLE • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 21 MODERN MILLS, 47,900,000 BARRELS ANNUAL CAPACITY



PRESTRESSED SHELLS, like this factory roof in the Netherlands were an important item on the agenda when 1,200 delegates from all quarters of the world converged last week on San Francisco to turn the . . .

Spotlight on Prestressed Concrete

Prestressed concrete has come of age. That was convincingly demonstrated last week in San Francisco where 1,200 persons from 31 countries and more than 40 states attended a week-long World Conference on Prestressed Concrete.

Almost every important organization or group in the prestressed field was there—engineers, contractors, manufacturers of prestressed products and materials suppliers. They came to share their experiences and developments with others. And they came to make sure that they were keeping up with others. There were, of course, many neophytes also.

The conference was a one-shot operation, sponsored by the University of California Department of Engineering and University Extension, much like the first conference on prestressed concrete held at Massachusetts Institute of Technology in 1951 (ENR Aug. 23, 1951, p. 24). Many technical organizations cooperated in presenting the conference. Perhaps the most important was the Prestressed Concrete Institute, whose two leading members in the San Francisco Bay area—Ben C. Gerwick, Co., Inc., and Basalt Rock Co.—were important factors in presenting the show. However, most credit should go to Prof. T. Y. Lin, of the University of California, who served as chairman of the general arrangements committee and conference coordinator. Included among the closely cooperating organizations was the International Federation for Prestressing, which held conferences in London in 1953 and Amsterdam in 1955 and plans a conference in Berlin. The program included 10 motion pictures on prestressed concrete. In addition, each registrant was given a preprint of 25 technical papers which were squeezed off the regular program by lack of time. But main interest centered on 30 papers—12 by foreign authors—and the accompanying discussion. Presentations made by foreign authors seemed to steal the spotlight. Abstracts of some of the more important of these follow.

• **Prestressed suspension bridges**—According to Daniel C. Vandepitte, of the University of Ghent (Belgium), the concept of the suspension bridge with unreinforced concrete stiffening beams that are prestressed by the main cables is derived in an entirely natural way from the conventional prestressed concrete bridge or from the self-anchored suspension bridge. The longest spans existing in prestressed concrete are about 375 ft long, and these involve girders that are very deep at the supports. Designers often have to increase depth of beams beyond the value which live-load moments require to provide enough eccentricity for the prestressing cable. The prestressed concrete suspension bridge concept abandons the requirement that the cable be placed in the girder concrete. In this application the prestressing element is almost entirely outside the concrete except at and near the end bearing anchorages.

As compared with ordinary steel suspension bridges, the prestressed concrete suspension bridge has the drawback of requiring falsework, heavier cables and towers and larger pier foundations. However, it has the advantages of having a cheaper deck, of needing no costly anchorages, of requiring very little maintenance, and of possessing much more rigidity; and provided the spans are not too long, the prestressed concrete suspension bridge costs less than its steel counterpart.

• **Concentrated tendons**—Another type of prestressing where tendons are outside the main concrete was described by Fritz Leonhardt, consulting engineer from Stuttgart, Germany. This method is usable, according to Mr. Leonhardt, for spans ranging from 80 to 400 ft and it concentrates large tendons out-

side the web of the concrete member. In other words, the web of the beam—either I or box shape—can be cast without any prestressing tendons cast inside. The prestressing tendons are laid alongside the web and stressed simultaneously with very large jacks. After this the tendons are concreted and grouted with mild steel bars connecting the tendon covering with the web to provide bond. Advantages of this type of tendons are as follows:

1. The width of the web can be reduced because size of the cable has no influence on web thickness.
2. Web concrete can be placed without disturbance of ducts or cables.
3. During construction the girder length can be interrupted by open joints to avoid temperature or shrinkage cracks.
4. It facilitates re-use of forms.
5. No cable casing is needed except above piers or at anchors.
6. The cable is open for inspection until after prestressing.
7. Friction is very low.
8. Encasing of the cable with good concrete can be well controlled.

• **Prestressed shells**—A discussion of prestressed shells was presented by Prof. A. M. Haas, Delft University, the Netherlands, who claimed several advantages for their use. Longer spans are possible and thus structures are less obstructed by columns. Cracking due to shrinkage, creep, temperature changes, etc., may be delayed or avoided. Water tightness is enhanced. Assembly of precast elements is facilitated.

In addition to these advantages, prestressing increases shear resistance, which is very important in shells. Due to the thinness of shell sections, shearing stresses are critical at an earlier stage than for beams. But early techniques included post-tensioning of edge beams only, which resulted in large shearing stresses at the intersection of beam and shell. This can be overcome partly by a local thickening of the slab or a gradual increase of the shell thickness near the edge (in addition to mild-steel reinforcing). But it can be overcome better by including the whole shell body in the prestressing technique.

Prof. Haas described a prestressed shell, north-light building for a confectionary factory at Osterhout, the Netherlands (photo page 23). This includes 22 bays of two 131 ft spans in the transverse direction with each bay spanning 39 ft. Shells are 2¾ in. thick.

• **Rigid building frames**—Use of prestressed concrete in active earthquake areas was discussed by Prof. Shizuo Ban, Kyoto University, Japan. Prof. Ban contends that it is not economical to design structures to be free from any cracking under the action of earthquake forces. However, he believes that all buildings should be designed to resist collapse, even in the case of the severest earthquake, to minimize fatalities. This calls for use of limit design in earthquake analyses. And it places emphasis on rigid connections.

Monolithic concrete structures can be prestressed by proper arrangement of prestressing tendons. In a simple rigid frame of two columns and one beam, length of the beam will be inevitably shortened by the prestressing operation and this results in lateral displacement or rotation of columns. Thus, the bending moment caused by the rotation of columns must be taken into account. Prof. Ban outlined a general procedure for the determination of tendons as well as magnitude of tension in a statically indeterminate building frame.

Since there are difficulties in prestressing monolithic structures, rigid frames are usually built up with precast, prestressed members. There are, however, difficulties in forming rigid connections. Prof. Ban contends that it is not economical to prestress the columns which are under normal compressive load and are subjected to sway moment in the case of an earthquake. He outlined a new method of connecting a post-tensioned prestressed concrete beam to the sides of columns without causing lateral deflection.

• **Fire resistance**—Research, as yet still incomplete, on fire resistance of prestressed concrete was discussed in a paper prepared by two English engineers—A. W. Hill, deputy technical director, Cement and Concrete Association, and L. A. Ashton, Fire Research Station, Great Britain. Tests are being carried out at the laboratories of the Joint Fire Research Organization at Borehm Wood, where facilities exist for testing walls, floors, columns and beams. In addition, a furnace capable of testing beams and floors of 24 ft span has recently been added to the equipment and is now in use.

It was concluded that prestressed concrete members are likely to have a lower fire resistance than their equivalents in normal reinforced concrete construction for three reasons: Prestressed concrete members have a smaller section and thus less heat capacity; cold-drawn steel wire used for prestressing is more susceptible to high temperature than mild steel, and it usually carries a stress that is a higher proportion of its ultimate strength than does mild steel; continuity—more commonly found in reinforced concrete—has a marked effect on fire resistance.

But the paper pointed out that in normal practice, the high-tensile steel in prestressed concrete can often be given additional cover as compared with reinforced concrete without loss of economy. Thus the inferior temperature-strength characteristics of high-tensile steel wire can be to some extent offset. With reinforced concrete the steel to be most effective must be located as near the tension face as possible and in such a position would be affected relatively quickly by fire. With prestressed concrete the wires are not so near the surface exposed to fire and are often spread over the section.

• **Segmental precasting**—A British consulting engineer, E. W. H. Gifford, described designs where beams are made up of conveniently short precast units that are united by the prestressing force. This force overcomes all bending tensile stresses in the working range and its value is such that it prevents shearing at the joints of the segments. Advantages claimed by Mr. Gifford include: Long, heavy beams may conveniently be subdivided for transport and handling. Forming costs will be reduced by reduction of the size of forms and increasing repetitive use of the forms. Intricate details—such as diaphragms—can be more easily constructed. Placing of high quality concrete can be better controlled in the small units.

• **Prestressing in U. S. S. R.**—Russia was represented at the conference by a 5-man delegation. Their people contributed liberally to discussions of the for-

PCI Elects

The Prestressed Concrete Institute held its annual meeting in San Francisco during the World Conference on Prestressed Concrete. Principal business was election of officers. New president is Ben C. Gerwick, Jr., of Ben C. Gerwick, Inc., San Francisco. He succeeds J. Ashton Gray, of Dura-Stress, Inc., Leesburg, Fla. New vice president is Harold A. Price, of Basalt Rock Co., Napa, Calif. And the secretary-treasurer is Peter J. Verna, Jr., Concrete Materials, Inc., Charlotte, N. C.

Directors elected to a two-year term include J. Ashton Gray, Leesburg, Fla.; D. P. Cone, Tampa, Fla.; G. W. Ford, Ft. Lauderdale, Fla.; and Prof. T. Y. Lin, Berkeley, Calif.

Directors for one year are J. O. Whitlock, Springfield, Ill.; F. S. Burtch, Trenton, N. J.; and P. E. Balcomb, Pottstown, Pa.

mal papers, pointing out that total production of prestressed concrete in Russia closely approaches that in the U.S. A Russian bridge engineer also said that there are in Russia either now in existence or under construction 150 railroad bridges and 200 highway bridges. The impression was given that prestressing is welcomed with open arms behind the Iron Curtain because it substitutes for steel and wood—commodities that are presumably in short supply.

The major Russian contribution to the conference was a paper on automation in fabrication of prestressed members by Prof. V. V. Mikhailov. He described a method of two and three-axis reinforcement of concrete using continuous stressed wires. This method involves pretensioning by pulling wire from reels through a stressing station over preset pins. Large-scale production of similar units is facilitated by automatic machines for reeling such wire onto forms. Such units in Russia manufacture beams, slabs, wall panels, and smaller units such as railroad ties and purlins. But such continuous units have certain shortcomings, according to Mr. Mikhailov. These include the necessity for highly skilled operators as well as the inability to make diverse products. To change the product, the machines must be completely reset, which is time-consuming. And considerable investment is required. However, the high production of these units fully justifies these shortcomings. Mr. Mikhailov pointed out that there are more than 15 large factories in Russia specializing in continuous prestressed fabrication of residential buildings.

Other important contributions to the conference by Europeans include a discussion of German practice by Prof. W. Zerna of Hanover Technical University. Prof. Zerna mentioned oval, ribbed steel used in post-tensioning. The bars are ribbed for better bond, and are oval shaped for better steel arrangement. They range in size from 20 to 50 sq mm.

Jean Muller of Enterprises Campenon Benrnard in France discussed prestressed dams in Europe. These works include anchoring the concrete to rock abutments and multiple arch structures where extensive prestressing was employed.

• **American contributions**—Emphasis in the foregoing papers by European engineers should not be construed to mean that the U.S. was not well represented on the program. Many U.S. projects and programs were discussed. These include the Lake Ponchartrain Bridge (ENR Aug. 30, 1956, p. 30), by W. F. Palmer of Palmer and Baker, Mobile, Ala.; the California Division of Architecture prestressed lift slab program (ENR July 4, p. 40), by Charles Peterson and A. H. Brownfield of that organization; the Illinois Toll Road prestressed bridge program, by M. E. Bender, of Joseph K. Knoerle and associates, Baltimore, and Jack Janney, Chicago consulting engineer; and the Reynolds Metals Co. Listerhill plant, by Ross H. Bryan, Nashville (Tenn.) consulting engineer.

Other U.S. papers attacked the problem from a more general angle. Keynote speaker William E. Dean, assistant state highway engineer for Florida, forecast a big future in the U.S. for prestressed concrete spurred by the highway program. He warned, however, that prestressed concrete is an engineered material and must be designed by competent professionals. He further urged continued efforts toward good workmanship on construction.

Further concern about careful fabrication and construction practices was exhibited in a presentation on California bridge experience (ENR July 18, p. 36) by Arthur L. Elliott of the California Bridge Department. One of Mr. Elliott's worries is inadequate grouting. He urged development of better grouting equipment. An example is recent California work where high pressure grout pumps—up to 2,000 psi—have been used.

Two papers included coverage of prestressed piles. One was by Ben C. Gerwick, Jr., and W. J. Talbot, of Ben C. Gerwick, Inc., and the other by M. F. Fornerod, of Raymond Concrete Pile Co. Several U.S. papers covered research phases of prestressing, including one by Truman R. Jones, Jr., of Texas A&M, that concluded that use of lightweight concrete in prestressed work was practical.

But perhaps the greatest difference between U.S. and European practice was demonstrated in descriptions of production facilities. On this subject, Peter J. Verna, Jr., of Charlotte, N. C., pointed out that pretensioning plants are a new development in the U.S. In 1953 there were only about a dozen, mostly for bridge beams. With development of building units, the number of plants has quickly mushroomed until today there are 200 or more, including those in the planning and construction stage. Reason is that the prestressed concrete industry has passed the three-way American construction test; that is: (1) Is it economical? (2) Will it do a better structural job? and (3) Will it conserve critical material? Mr. Verna explained the things American pretensioning plants concentrate on—wire storage, curing methods, concrete distribution methods, efficient materials handling and quick release of pretensioning beds for new pours. Further, American plants must of necessity be located near transportation facilities. All are located on or near major highways, most have rail haul facilities available and many have water haul facilities close by.

Mr. Verna illustrated his paper with many examples, including his plant, Concrete Materials, Inc., at Charlotte, N. C. This particular plant has mixer-truck and rail-car passageway between the first and second double beds for quick movement of finished product from beds to stockpile area beyond the end of the craneway.

Prestressed Span Record Depends on Bids

A proposed 300 ft main span prestressed bridge was described at the prestressed conference by a Bureau of Public Roads engineer, David M. Goodall. This would be the longest span U.S. prestressed bridge and would rank third in the world. But there is a chance the structure will be built of steel instead of prestressed concrete. Alternate bids are to be opened Aug. 16 at the Bureau of Public Roads office in Portland, Ore. Preliminary estimates made a year ago showed the prestressed bridge to be $125,000 cheaper than the steel design and BPR engineers believe the margin may be greater now.

The bridge is to be located in Mount Rainier National Park about a half mile downstream from the face of Nisqually Glacier. Two previous bridges of shorter span have been destroyed by glacier-induced rock and water flows.

In addition to conventional concrete box-girder approach spans, the structure will have a 300 ft main span plus two cantilever spans of 50 and 90 ft. Alternate bids in steel and prestressed concrete are being taken for this 440 ft section. The prestressed design calls for a box structure, with three cells being 14 ft deep in the main span. Prestressing cables would be threaded from end-anchorage jacking blocks at each end of the cantilevers through the hollow cells. The cable profile would be established by diaphragms at 30 ft centers in the main span. The 54 stranded cables of 2 in. nominal diameter would be unbonded. Purpose is to reduce friction and to facilitate cable layout, which would be extremely difficult in thin webs. Manholes would allow access to the cables.

The bridge will have a 28 ft wide roadway plus a 3 ft sidewalk on one side and an 18 in. safety curb on the other. Design live load is H15-S12.

Contract will allow 2 years for completion. But the prestressed portion will of necessity be a one season job, probably to be handled next summer.

$2.875 Billion Allocated for Highways

State highway departments last week received federal-aid allocations of $2.875 billion for fiscal year 1959, which starts next July 1. With state matching money, this will pay for nearly $4 billion worth of new highways.

Federal funds apportioned to the states are available for obligation as rapidly as the highway departments can complete designs, take bids and award contracts. Commerce Secretary Weeks and the Bureau of Public Roads released the allocations five months in advance of the date required by law as part of the joint effort of the federal government and the states to speed construction of the interstate system.

Last week's allocation of funds is the last automatic apportionment of federal money to be made under the 1956 Highway Act—the law that set up the 15-year program.

Next year's allocations—for fiscal 1960—will be on a different basis, established by the 1956 law, for interstate construction.

For the other federal-aid roads—primary and secondary, with their urban connections—Congress will have to pass new legislation at the next session. It is almost a certainty that Congress will increase the funds for this construction.

Interstate allocations, on the other hand, will automatically switch to a new basis for fiscal 1960. Beginning with that year, the law requires that interstate funds be apportioned in relation to need, defined as the proportionate cost of completing the interstate mileage in each state.

Revised estimates of these costs have been worked up by the states during the last eight months. The new figures are now being assembled by BPR for delivery to Congress by Jan. 2, the final day set by law.

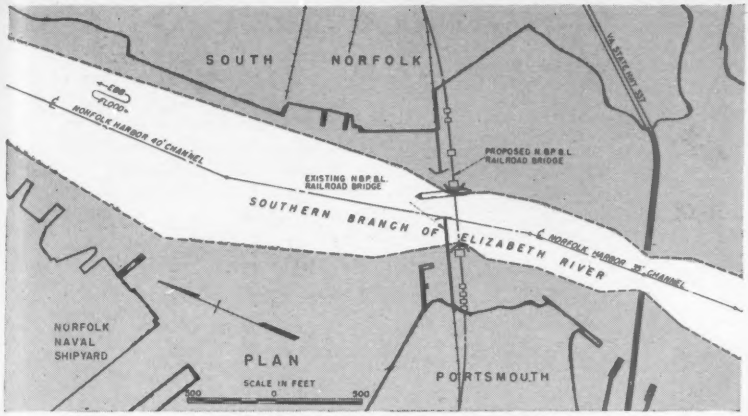
Earlier estimates by the states in 1954 resulted in an overall cost estimate of $27 million for the 40,000 mile system. Rising construction costs and a better understanding of 1957 design standards by the highway departments are expected to revise the total upward to between $35 billion and $40 billion when the new figures are added up. Some states have found their 1954 estimates to be much too low, but a few states have been able to cut their earlier cost totals.

One thing is sure. The apportionment for fiscal 1960 will be a little less than the total allocated last week. According to Treasury estimates, the flow of highway user taxes into the federal highway trust fund will permit apportionment of no more than $2.5 billion for fiscal 1960, as compared with last week's total of $2.875 billion. Assuming that Congress sets primary, secondary and urban allotments at $900 million for fiscal 1960, the amount available for interstate construction will drop to $1.6 billion from the $2 billion going out for fiscal 1959. This $1.6 billion would be $600 million less than the $2.2 billion authorized for interstate construction in fiscal 1960, but funds would be lacking to finance that total. The slack would be taken up, in later years by extending the program (ENR April 11, p. 21).

Where the Money Will Go

The table below gives (in millions of dollars) the federal-aid allocations for highways for both fiscal 1958 and fiscal 1959. The first column under each year (T) is the total allocation for the three systems—primary, secondary and urban mileage. The second column (I) is the allocation for the interstate system. The third column (S) gives the total allocation to each state.

	For FY 1958			For FY 1959		
STATE	(T)	(I)	(S)	(T)	(I)	(S)
Alabama	$17.0	$34.5	$51.5	$17.6	$40.7	$58.3
Arizona	10.2	19.5	29.7	10.5	22.8	33.3
Arkansas	12.6	24.7	37.3	12.8	28.7	41.5
California	45.7	96.9	142.6	48.0	115.4	163.4
Colorado	13.4	23.2	36.6	13.6	27.0	40.7
Connecticut	7.9	16.4	24.3	8.1	19.2	27.3
Delaware	3.6	10.6	14.2	3.7	12.4	16.2
Florida	14.0	28.9	42.9	14.2	33.7	47.9
Georgia	19.6	39.6	59.2	19.8	46.0	65.9
Idaho	8.3	17.2	25.5	8.6	20.2	28.8
Illinois	38.0	80.2	118.2	38.7	93.7	132.4
Indiana	20.3	41.4	61.7	20.8	48.3	69.1
Iowa	18.3	34.7	53.0	18.6	40.3	58.8
Kansas	17.3	30.9	48.2	17.7	35.9	53.6
Kentucky	15.2	31.9	47.1	15.5	37.2	52.7
Louisiana	13.5	28.1	41.6	13.7	32.7	46.4
Maine	6.4	13.7	20.1	6.5	16.0	22.5
Maryland	9.2	20.4	29.6	9.6	24.0	33.6
Massachusetts	15.8	36.3	52.1	16.1	42.5	58.6
Michigan	29.3	61.1	90.4	30.2	72.0	102.1
Minnesota	20.2	38.3	58.5	20.8	45.0	65.7
Mississippi	13.5	27.0	40.5	13.9	31.5	45.4
Missouri	23.7	46.0	69.7	24.0	53.6	77.6
Montana	13.5	24.4	37.9	13.8	28.5	42.3
Nebraska	14.1	24.4	38.5	14.4	28.4	42.9
Nevada	8.2	17.8	26.0	8.4	20.7	29.1
New Hampshire	3.8	10.6	14.4	3.9	12.4	16.4
New Jersey	16.2	37.2	53.4	16.5	43.5	60.0
New Mexico	11.0	20.6	31.6	11.3	24.2	35.5
New York	54.2	120.5	174.7	56.1	141.9	197.9
North Carolina	20.5	43.3	63.8	20.8	50.5	71.3
North Dakota	9.7	18.8	28.5	9.8	21.9	31.7
Ohio	34.1	72.8	106.9	34.6	84.8	119.3
Oklahoma	16.2	30.4	46.6	16.7	35.7	52.4
Oregon	12.6	23.1	35.7	12.8	26.8	39.7
Pennsylvania	41.1	91.1	132.2	41.8	106.4	148.2
Rhode Island	4.7	10.6	15.3	4.8	12.4	17.3
South Carolina	10.8	22.9	33.7	11.0	26.7	37.7
South Dakota	10.2	19.7	29.9	10.6	23.2	33.8
Tennessee	17.9	36.4	54.3	18.0	42.2	60.3
Texas	51.3	97.7	149.0	53.0	115.0	168.0
Utah	8.1	16.6	24.7	8.3	19.3	27.6
Vermont	3.5	10.6	14.1	3.6	12.4	16.0
Virginia	16.4	34.4	50.8	16.7	40.1	56.7
Washington	13.8	27.3	41.1	14.3	32.2	46.4
West Virginia	9.3	20.3	29.6	9.4	23.6	33.0
Wisconsin	19.5	38.7	58.2	19.8	45.2	65.0
Wyoming	8.2	17.7	25.9	8.5	20.6	29.1
Hawaii	3.9	.....	3.9	4.0	None	4.0
District of Columbia	5.1	10.6	15.7	5.2	12.4	17.6
Puerto Rico	5.9	.....	5.9	60.1	None	6.1
Alaska	13.2	.....	13.2	13.4	None	13.4
Totals	$850.0	$1,700.0	$2,550.0	$875.0	$2,000.0	$2,875.0



New Bridge to Be Built Here . . .

. . . Old One Menaces Navigation

A railroad bridge crossing the southern branch of the Elizabeth River between Norfolk and Portsmouth, long outmoded and considered a menace to navigation, is now being replaced at a cost of more than $2.7 million.

The existing swing bridge, owned by the Norfolk-Portsmouth Belt Line Railroad Co. of Norfolk, was completed in 1898. It was ordered altered because its narrow opening and "gross misalignment" with the opening in a highway bridge 1,350 ft upstream and its misalignment with the channel was considered a serious obstruction and hazard to navigation.

Under plans prepared by the railroad, the replacement will be a new vertical lift-type bridge, with a horizontal clearance of 300 ft between fenders, and a vertical clearance of 145 ft at mean high water in the open position. The lift span itself will be 383 ft long. Centerline of the new structure will be 140 ft west, and upstream of the existing bridge. The lift towers will be approximately 179 ft high, measured from the top of the bridge piers.

The railroad will pay about $390,000 as its share of the cost of alteration.

• **Work progress**—Work was divided into two phases—the substructure and grading of approaches, and erection of the superstructure. The first phase, awarded to Lang Construction Co. of Hampton in November, 1955, is now more than 93% complete. A contract for the superstructure, laying track and removing the superstructure of the old bridge was awarded to American Bridge Co. in July, 1956, but no steel is expected to be erected before the fall of this year.

Major accidents have occurred, in 1939 and in 1943. Damage to the highway bridge amounted to $440,000, and considerable loss accrued, due to the blocking of the channel. Since 1943, 42 minor accidents have taken place at the railroad bridge. Extraordinary precautions, such as special pilot service and additional tugs, have had to be used for many years to effect the movement of large vessels. These services have cost shipping interests an estimated $300,000 annually.

Bridge-Tunnel Pushed

North-south route across Chesapeake Bay approved

Armed with an engineering report, the Chesapeake Bay Ferry Commission has approved a north-south route for a proposed bridge-tunnel across lower Chesapeake Bay.

The route, recommended by Wilbur Smith & Associates, of New Haven, Conn., would connect Kiptopeke on the DelMarVa peninsula to the north, with a point near Little Creek, just outside Norfolk, Va. It would almost exactly follow the route of the existing ferry line.

Cost of the project as estimated by Sverdrup and Parcel of St. Louis, Mo., would be $144 million. The over-all length of structure between these two points would be 93,100 ft.

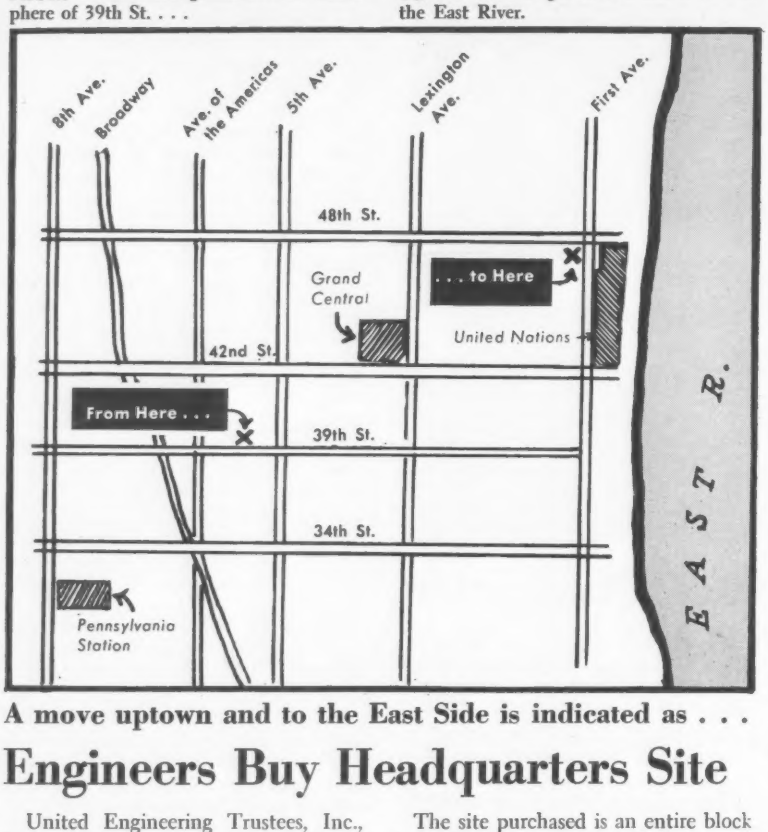
Plans for some sort of a physical connection between the peninsula and the mainland of Virginia have been under discussion for many years, but only recently have reached the stage of active consideration. The engineering studies were made under an appropriation by the Ferry Commission with authorization from the Virginia legislature.

The traffic survey considered two routes for the connection; one, the north-south route recommended, the other running from Kiptopeke to the mainland at Buckroe Beach, near Hampton. Cost of this second facility, which would be 99,800 ft in length, was estimated at $115.6 million. Extra cost of the north-south route would be chargeable to the need for a deep tunnel beneath Thimble Shoal channel, to provide adequate clearance for Navy installations at Norfolk.

The north-south route would include high level bridges over North and Baltimore channels with the remainder of the structure on a trestle. If the east-west route had been chosen, high level bridges would be required also over North and Baltimore channels, with a third structure near the peninsula itself.

FROM the crowded garment-center atmosphere of 39th St. . . .

TO the UN's neighborhood and a view of the East River.



A move uptown and to the East Side is indicated as . . .

Engineers Buy Headquarters Site

United Engineering Trustees, Inc., has announced purchase of 37,500 sq ft of land in an improved, and still improving, section of New York City for a price near $2.7 million. It is to be assumed, of course, that this means the familiar old 29 W. 39th St. of Engineering Societies Headquarters will sometime in the now foreseeable future change to some address (possibly 850) on United Nations Plaza, as First Ave. is known for its six block length facing the UN.

The site purchased is an entire block front along the avenue, 150 ft deep on 47th St. and 225 ft deep on 48th St.

UET has owned and operated the 29 W. 39th St. property since it was built in 1906 with a gift from Andrew Carnegie of slightly over $1 million. Within UET the five major engineering societies (civil, electrical, mechanical, mining and chemical) will be associated in development of the new property. These five groups with a total membership of some 175,000 engineers are expected to be joined by other engineering societies in the new headquarters structure to be built.

Purchase of the site was hailed locally this week as final ratification of the engineering societies' decision to find needed larger quarters in New York, rather than moving to some other city.

Shreve, Lamb & Harmon Associates have been the architects on the preliminary plans.

First Water Spills Over Bull Shoals Dam

Water poured over the spillway of the 5-year-old, $75 million Bull Shoals Dam in North-Central Arkansas for the first time last week.

Rains of April, May and June filled the White River reservoir with more than 2 million acre-ft of water, which the Corps of Engineers is releasing at the rate of about 50,000 acre-ft a day.

The water elevation reached a record 247.4 ft—0.6 ft from the top of the spillway gates.

The Engineers would like to release most of the overload, but the problem isn't that simple. The snag is rainbow trout in the river below the dam. They like water temperature in the 60-65 F range. During the first part of the spillway overflow, the water temperature rose to 70 F before the Arkansas Game and Fish Commission objected. Now the Engineers must juggle water releases to stabilize the pressures on the dam—and please the trout.

Flood Waters Hit Las Vegas As Three Small Dams Fail

A flash flood ripped out three Gallinas River dams in northeastern New Mexico and sent an estimated 90 million gallons of water rushing through Las Vegas, N. M., this Monday, Aug. 5.

Las Vegas escaped flooding as river banks through the city of 14,000 held, but a dozen homes upstream and 25 or 30 houses downstream were flooded. Early warnings by law enforcement officers and National Guardsmen were credited with preventing loss of life. Damage to property and livestock was reported heavy.

The water struck swiftly, shortly after midnight. By mid-morning Monday the flood danger had abated. However, the Gallinas was still carrying its heaviest flow in years.

The dams, built by the Santa Fe Railway to provide ice ponds more than 50 years ago, were of masonry and wood construction and had been used lately as a supplementary source of domestic water for Las Vegas. The masonry held but wooden portions gave way to the rush of waters when hit by a 2½ in. upstream rain.

"Sneak" Bridge Crosses River, Officials Too

Officials of two states and the federal government are still gasping over the discovery a couple of weeks ago that a new 410 ft long bridge exists over the Colorado River—without benefit of permission from anybody—and that its owners are charging tolls for use.

The bridge was "discovered" when owners of small boats complained that it was impeding their navigation. Investigation showed that a group of farmers—seeking a shorter route between the farmlands on the Arizona side of the river and processing plants on the California side—had built their structure at a point midway between Blythe, Calif., and Yuma, Ariz. The structure cost $50,000, and its owners were hauling produce over it, charging other users up to $2 per vehicle, and figuring to pay off their costs in a year or so. The steel beam structure with a timber plank roadway stands on well-casings sunk to bedrock and filled with concrete.

Discovery of the bridge brought action from six agencies (Corps of Engineers, Department of the Army, Bureau of Reclamation, Arizona and California Highway Departments, California Toll Bridge Authority). Result: The owners were ordered to modify the structure to conform with navigational requirements, and to see that its roughly 10 ft clearance over mean water doesn't conflict with flood-control requirements.

State Wins on Right-of-Way

The Vermont Supreme Court has cited public safety as the "critical element" in determining whether "reasonable necessity" exists in acquiring land for the interstate road system.

The decision was an apparent victory for the state in its efforts to speed construction of new highways. Under existing law (ENR Dec. 27, 1956, p. 20), appeals could be taken on condemnation proceedings on the grounds of necessity as well as on grounds of damage. In this provision highway administrators saw delays mounting into years on acquisition of highway right-of-way.

In upholding the state on all points in land dispute, Associate Justic Benjamin N. Hulburd said there is no validity to the argument that "the state doesn't have to take my land" if there is other land available.

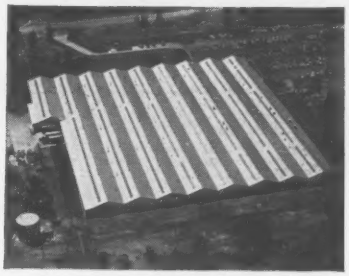
"If imperative or absolute necessity were the test, there would be no practical way in which the crooked road could be made straight," Justice Hulburd wrote.

John D. Latchis of Brattleboro and his brother, Spero, were turned down on both major issues in their appeal to the Supreme Court. One involved the necessity of taking land for the interstate project and the other protested $10,000 damages awarded by road commissioners and upheld by Superior Julge Percy L. Shangraw in Windham County Court.

Justic Hulburd's opinion, joined in unanimously by the other four justices, said the "overall necessity" was established and recognized by the 1955 Legislature in adopting the limited access bill and authorizing the inter-

(*Continued on page 30*)

It makes sense to standardize on buildings, too!



Standardized Butler metal buildings are available from stock in sizes from a small pump house to structures of any desired width and length.

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Butler

buildings

Everyone knows that standardization brings down costs. But is it—at last—practical in construction too? Thousands of firms—large and small—have learned that it is extremely practical—with Butler pre-engineered metal buildings.

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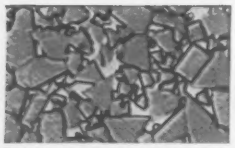
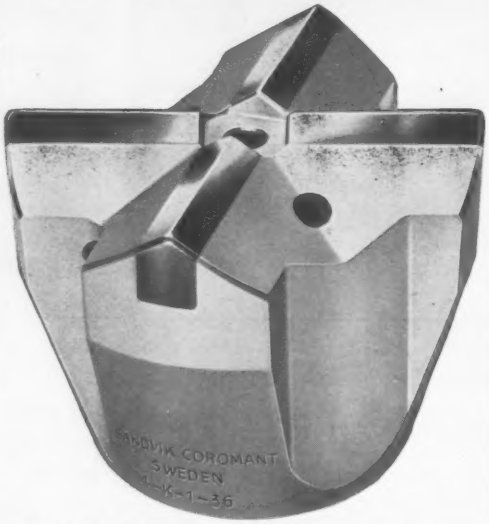
Longer bit life—with *new* Sandvik Coromant X-Bits



Sandvik Coromant Tungsten Carbide. (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities—therefore stronger, longer-lived.

Low quality Tungsten Carbide. (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.



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1 Only first-quality tungsten carbide is used—as shown in the microphotos above. This means less wear, longer life and a better job.

2 the bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.

3 the bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

THESE STANDARD SIZES ARE AVAILABLE		
	THREAD	DIAMETERS AVAILABLE (IN INCHES)
SHOULDER TYPE	7/8" F	1½
	1" H	1½, 1⅝, 1¾ and 1⅞
	1 3/16" D	2, 2⅛, 2¼, 2⅜, 2½, 2⅝ and 3
	1 11/16" K	3, 3½, 4 and 4½
BOTTOMING TYPE	1¼" Rope	1⅞, 2, 2⅛, 2½, 2⅝ and 3
	2" Rope	3½, 4, 4½ and 5
	400	2, 2¼ and 2½
	600	2½, 2⅝, 3 and 3½

The sizes underlined are X-shaped bits

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels—the most widely used in the world—cross bits from 1½" to 2½" and extension steel equipment.

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CANADA— *Montreal Airport, Quebec. Phone — Melrose 1-1871*
MEXICO— *Apartado Postal 56, Torreon, Coahuila. Phone — 39-07*

DST.78

state road project. (ENR Dec. 1956, p. 20)

The only remaining question, the court said, is whether the taking of the particular land under dispute is "reasonably necessary" for the accomplishment of the ends envisioned by the legislature.

In effect, the Supreme Court held that the state need show only "reasonable necessity" and not "imperative or absolute" necessity.

"To justify the taking," the decision said, "the interest of the state must require it, and it must be shown so, but only to the extent it is reasonably necessary to accomplish the end in view after weighing all the circumstances which bear on any given situation."

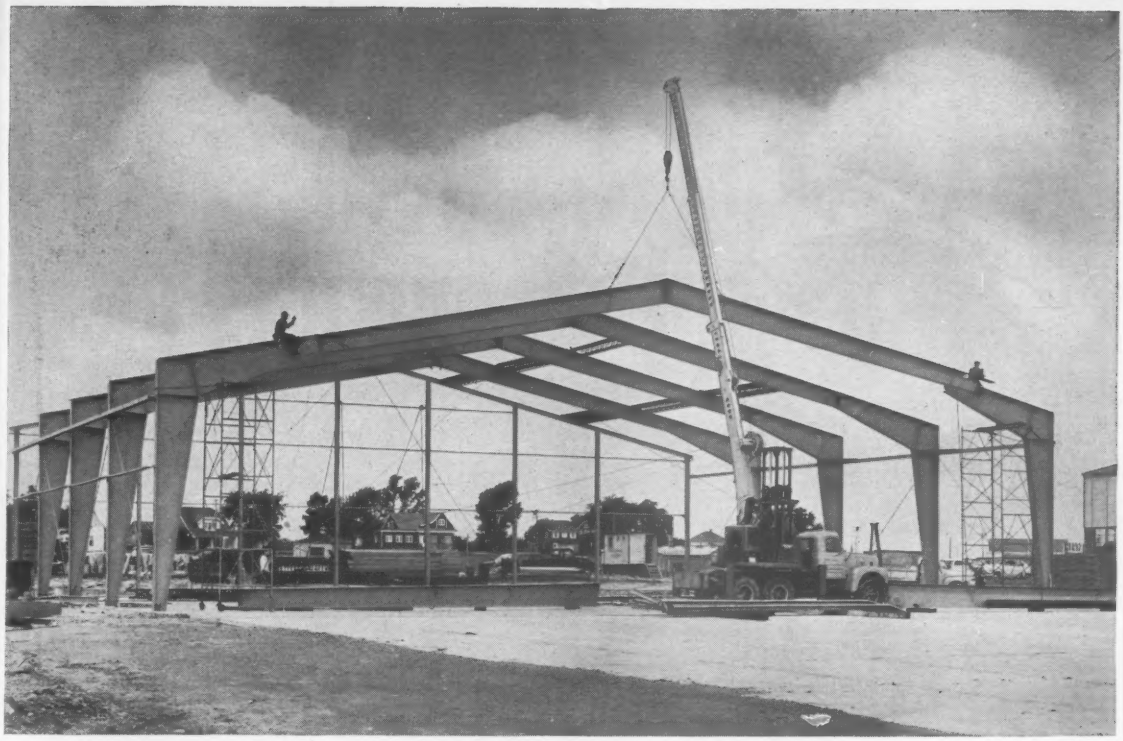
Justice Hulburd said that in determining whether reasonable necessity exists with respect to highways, "public safety has become the critical element." The Supreme Court found ample testimony, Justice Hulburd wrote, that an alternative route suggested by the Latchis brothers "failed of approval by state and federal authorities on account of its highway safety."

—Briefs

• **Heat pump uses below freezing air**—Heating of the Sylvania Electric Products, Inc., research and development center, now being built at Amherst, N. Y., will be accomplished by a heat-pump system that will extract heat from outside air even at below-freezing temperatures. A compound-compression air-source heat pump will both heat the 90,000 sq ft, 2½ story building in cold weather and cool it in the summer. The system has a cooling capacity of 250 tons and heating capacity of 2.4 million Btu per hour. Hot or chilled water is circulated to the air-conditioning units by two 25 hp. pumps. Architect and engineer for the building is J. Fruchtbaum, Buffalo, N. Y. John W. Cowper Co., Inc., Buffalo, is the general contractor.

• **Shopping center bisects valley**—Work is scheduled to start soon on an unusual $5 million, 20 acre, shopping center at Little Rock. Richard W. Kroh & Associates, architects for the project, instead of leveling a small valley cutting across the site, took full advantage of the terrain by coming up with a design that added three acres for parking.

This was done by designing the main building, containing 243,000 sq ft of floor space, as a 3 story building at the center of the valley and reducing it to 1 story as it approaches the hills on either side. A parking area in the center of the valley was given a roof on which cars are parked. This roof deck is level with the hilltops and adds room for about 400 cars.



LOOK! A Dozen Erecting Problems... And H-5 Hydrocrane Solves Them All

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4. Close quarter work	Shortest tail swing in its class
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7. Reach into buildings	Telescoping boom
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9. Inexperienced operator	Clearly marked hand levers — no foot brakes
10. Work on rough, irregular terrain	Hydraulic outriggers level automatically
11. Require fast line speeds	New selector valve doubles line speeds
12. Downtime	Simplicity of design cuts costly maintenance

Yes, the Hydrocrane is the only crane-excavator that does so many jobs so well. Mounted on a new or low-cost used truck, the 10-ton H-5 Hydrocrane is the erecting crane that returns more profit per dollar invested than any other machine in its class. Your Bucyrus-Erie distributor will be pleased to present the whole Hydrocrane story. 207H57

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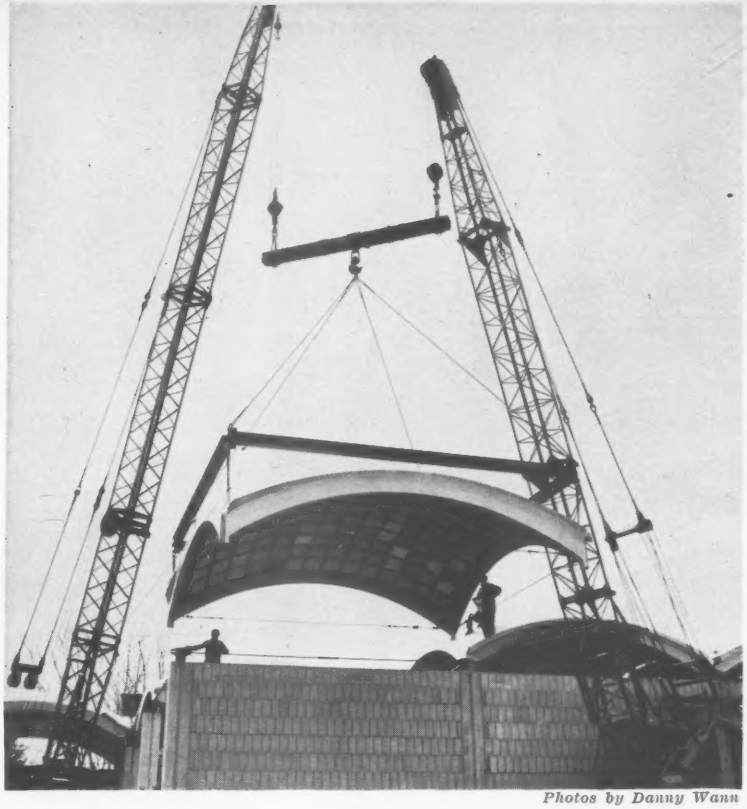
BETTER RUBBER FROM START TO FINISH

Circular translational shells, 24 ft square and 6½ ft high, checkered on the underside with insulating blocks cast into the concrete, comprise both roof and ceiling of a supermarket in New Canaan, Conn.



Photos by Danny Wann

Precast Concrete Bubbles Roof a Market

An eye-catching cluster of concrete "bubbles" roofs a new supermarket in New Canaan, Conn. Looking a little like a giant version of the familiar molded paper egg carton, a dozen of the precast cells are arranged in a 3 x 4 grid to cover the 96 x 72 ft area of the building.

The roof played an important role in holding costs down to a fairly economical level. Insulation was cast right into the underside of the concrete, and the curved inside surfaces of the shells are exposed as the finished ceiling. Including air conditioning, the building cost $13.25 per sq ft.

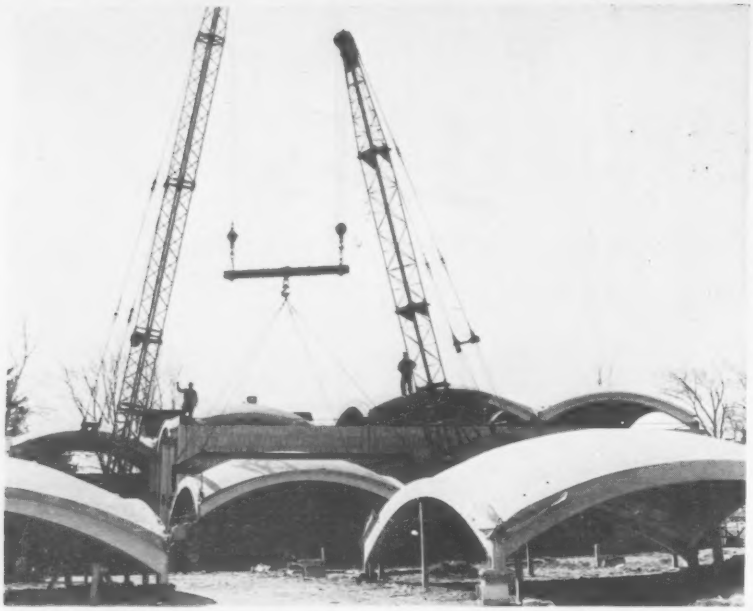
In plan the shells are 24 ft square Viewed in elevation, the four sides are circular arches 24 ft in span and 3¼ ft high. The crown of the shell rises an additional 3¼ ft, giving the side view a total height of 6½ ft. The edge arches, instead of standing plumb, lean slightly toward the interior of the shell.

• **Easy to form**—Geometrically speaking the shells are surfaces of translation

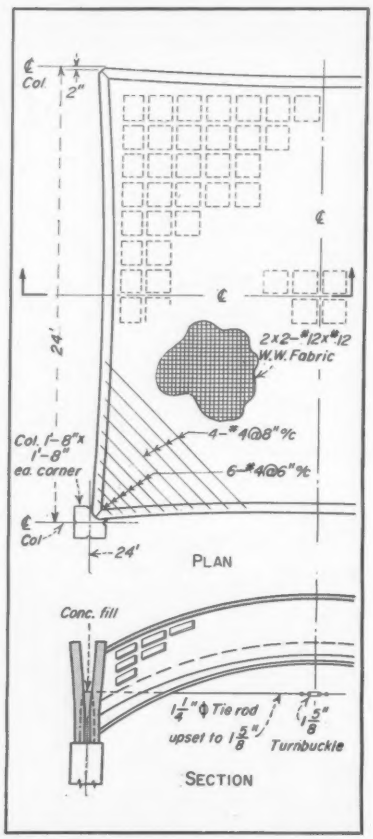
FALSEWORK FOR SHELLS consisted of curved wood ribs 18 in. c-c fitted within a border of plywood forms for the edge arches. Forms were shop built and trucked to site.

INSULATION BLOCKS were laid on forms, cast into the underside of shells.

. . . Concrete shells were precast on the job site



TWO CRANES ERECTED the shells at the rate of two per day. Both rigs worked on each lift, picking up the 13½ ton shells by means of lifting eyes embedded at the corners.



CONCRETE SHELL, as thin as 1½ in., is stiffened by 6 in. thick edge arches.

(generated by a curve moving through space with translational motion). This type of surface is peculiarly adaptable to construction in concrete because all cross sections parallel to the generating curve repeat the shape of that curve. This means, of course, that the formwork can be supported by a succession of identically shaped members.

The generating curve for the shells for this job is a vertical circular arc with a 24 ft chord and 3¼ ft middle ordinate—which also is the elevation of the edge arch. The translational path followed by any point on the arc is an identical circular arc in a vertical plane at right angles to the plane of the generating curve. Consequently, all cross sections parallel to a side of the shell have the same shape.

• **Form construction**—Curved wood ribs spaced about 18 in. c-c were used by the contractor in building the forms. Each rib consisted of three pieces of 2 x 10 or 2 x 12 board, bandsawed to the required curvature and spliced end to end with nailed plywood splice plates. Edge beams were formed with plywood.

The Wenzel Co., Stamford (Conn.) contractor who built the supermarket, constructed the forms in his shop. He assembled the edge-beam forms first and then fitted in the ribs, which had the same curvature but varied slightly in length because of the inclination of the edge arches. At the site the form assemblies were shored up by additional supports under the ribs.

• **Insulating form liners**—Before casting the shells, the contractor installed roof-insulation blocks directly on the forms. These wood-fiber-concrete blocks, 16 x 16 x 2½ in., were placed 3 in. apart, and 3 x ½ in. boards were laid in the spaces between.

Then, after the reinforcing steel was in place, concrete was placed to a depth of 1½ in. over the insulation. This created a shell with a grid of 3 in. ribs. (Rib strength was not considered, however, in the shell design.) The edge arches are 6 in. wide and vary in depth from 12 in. at the center to 18 in. at the haunch.

Reinforcement of the shells consists of 2 x 2 in. welded wire fabric over the entire shell and ten No. 4 bars placed diagonally across each corner. A lifting eye was also embedded at each corner.

• **Erection**—Two cranes worked together to erect the shells. The rigs jointly hoisted an equalizer bar from whose center a square steel spreader frame—approximately the same size as the shell—was suspended by four cables. The 13½ ton shell was hung, in turn, from the corners of the frame.

The shell underside—exposed ribs and insulating blocks—comprises the finished ceiling. Outside, the shells are covered with a three-coat waterproofing membrane of acrylic plastic paint.

The roof is drained by pipes in the center of interior columns and scuppers around the perimeter.

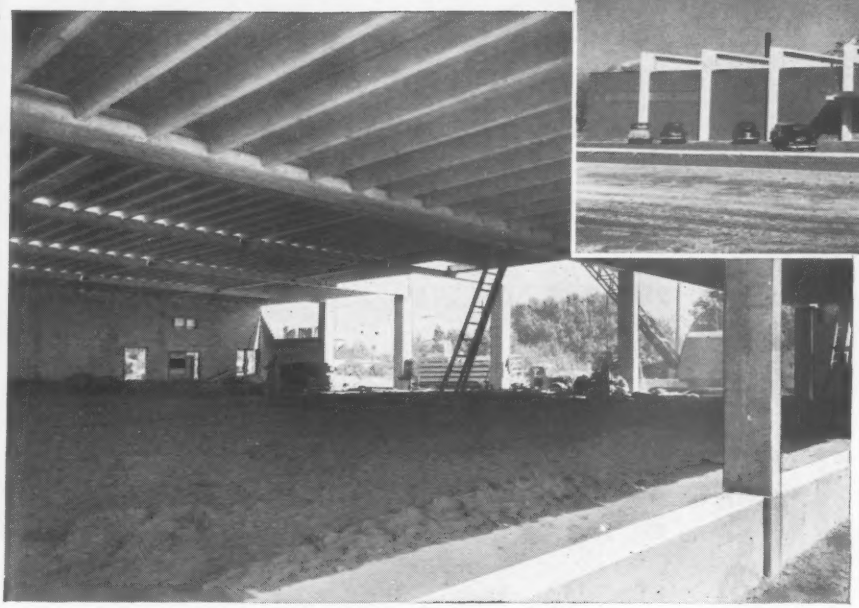
• **Lens-shaped skylights**—Inclined as they are, the edge arches of adjacent shells lean away from one another, thus creating lens-shaped openings. Covered with translucent reinforced plastic, the openings serve as skylights.

Where one side of a shell is also the boundary of the roof, a small concrete canopy was cast in place on the outside face of the edge arch to make the profile vertical.

Wall construction is concrete block—8 x 8 x 16 in. units, laid vertically, with tooled joints. Floors are concrete.

The building was designed for Walter Stewart, of New Canaan, by Victor Christ-Janer & Associates, New Canaan architects. The structural design was handled by the New York City firm of Paul Weidlinger, Consulting Engineer, Mario Salvadori, Associate. Matthys Levy was engineer in charge for the consulting firm. In charge of the job for the Wenzel Co. were Philip Kiernan, field supervisor, and Louis Iorio, job foreman.

Prof. Salvadori, in designing the shells, drew on experience acquired in designing and testing translational shells for a number of Italian projects (Analysis and Testing of Translational Shells, Title No. 52-64, Journal of the American Concrete Institute, June, 1956).



Above: Front and side view of the nearly completed Safeway Store built in Midvale, Utah.

Left: Interior of the store showing precast concrete channel roof slabs placed on lower flange of the main prestressed concrete roof beams.

Architect, Wm. J. Monroe, Jr., Salt Lake City; Contractor, Ragnar-Benson, Inc., Chicago.

Super Mart's 108 ft. clear span made possible by Precast, Prestressed Concrete Beams

The Safeway Store Building in Midvale, Utah, obtained a clear floor area 108′ wide by 130′ deep through the use of only five precast, prestressed concrete beams. The beams, cast on the job site, were placed to give a 16′ space above the finished floor in the main store area.

The roof required about 13,500 sq. ft. of precast concrete channel slabs with conventional reinforcement. These channels, 2′ wide with 10″ legs, were placed on the lower flanges of the main prestressed beams. This allowed the prestressed concrete beams to stand boldly above the finished roof line to produce a dramatic architectural effect.

Structures designed to utilize precast and prestressed units can be built for any usage and to conform with any applicable local building codes. Like all concrete structures they offer many advantages: great strength, extra long life, very low maintenance cost and true *low-annual-cost* service. In addition, such structures provide great resistance to destructive natural forces such as storms, decay, termites and especially fire.

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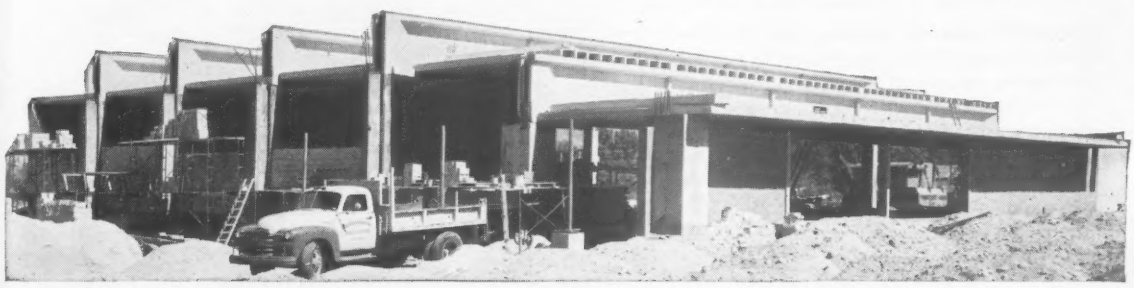
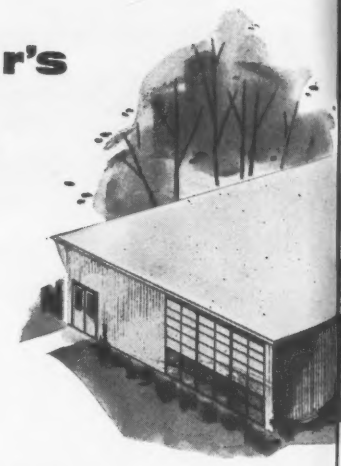
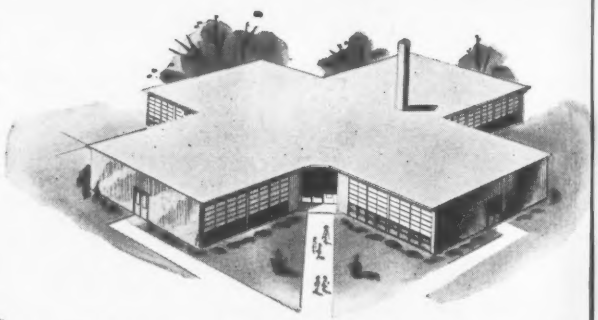


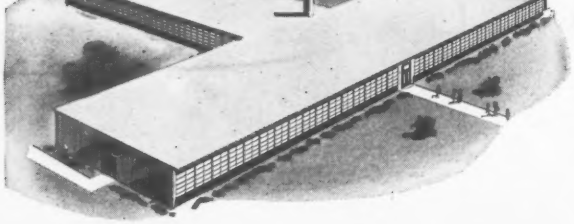
Get next year's classes into classrooms next year...



New Adaptation of Truscon

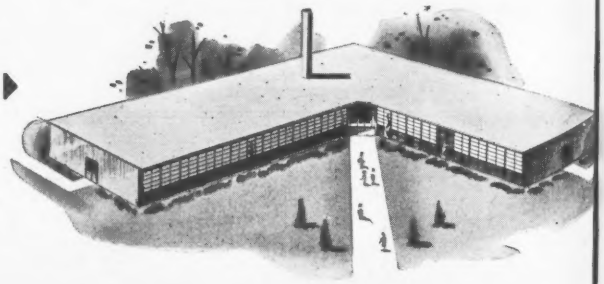
A basic plan for small-school construction at lowest possible cost. This design provides a single-story elementary school, completely integrated. It includes all elements of good school planning at moderate cost. Thanks to Truscon Vision-Vent Window Walls, wings have full daylighting on three sides. Offices and service facilities are at the center of the "X" shaped building. Additional facilities or more classrooms can be added by expansion in any direction.



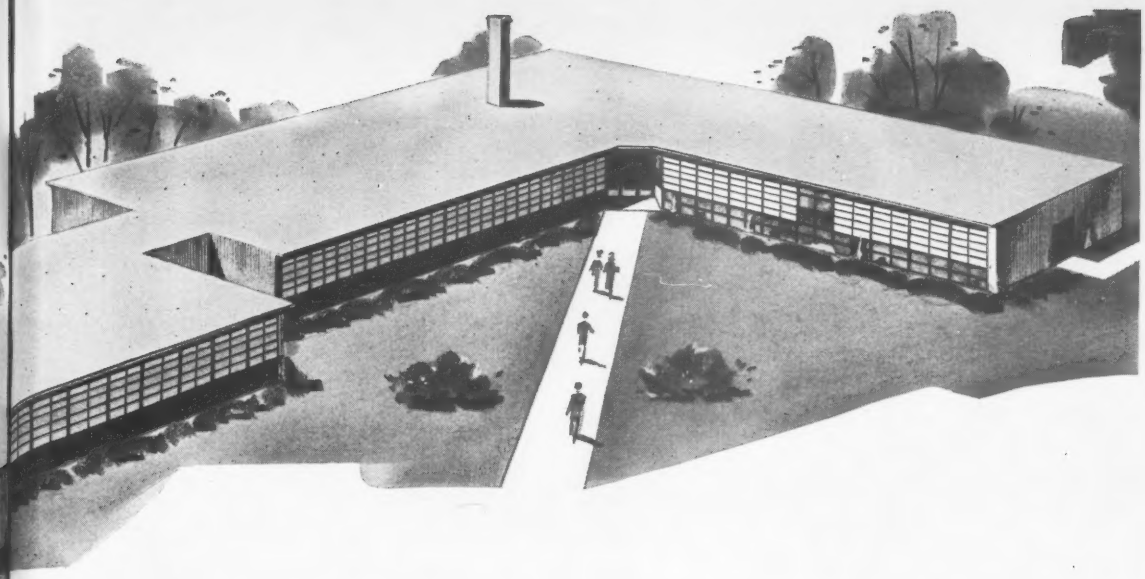


◀ Retain the low cost of the basic plan . . . then plan to fit the site. Proper site is vital. Grade groupings, travel distances, accessibility of utilities, sewerage, fire protection, and transportation may be more important than topography. Projected community growth is an influence, too. The Truscon system of standard units which can be infinitely varied is the ideal solution to topographical problems, permitting the architect to select the site for its convenience rather than ground formation.

Standard "L" units provide unlimited room for future expansion. All insulated end walls of either wing can be removed, additional space added, and the end wall re-used. This means that expansion of a school building is limited only by the site, as indicated in main illustration above. Additions can be made rapidly, economically and in perfect architectural harmony. The best protection against obsolescence is provision for easy expansion. ▶



BETTER SCHOOLS BUILD BETTER COMMUNITIES



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Truscon now offers engineers, contractors and architects everywhere a pattern for designing low-cost schools using economical standard building products. Using these prototype schools as a guide, you can help your communities more easily solve the pressing problem of classroom shortages. You can design classrooms around local needs, both current and future. You can provide for expansion.

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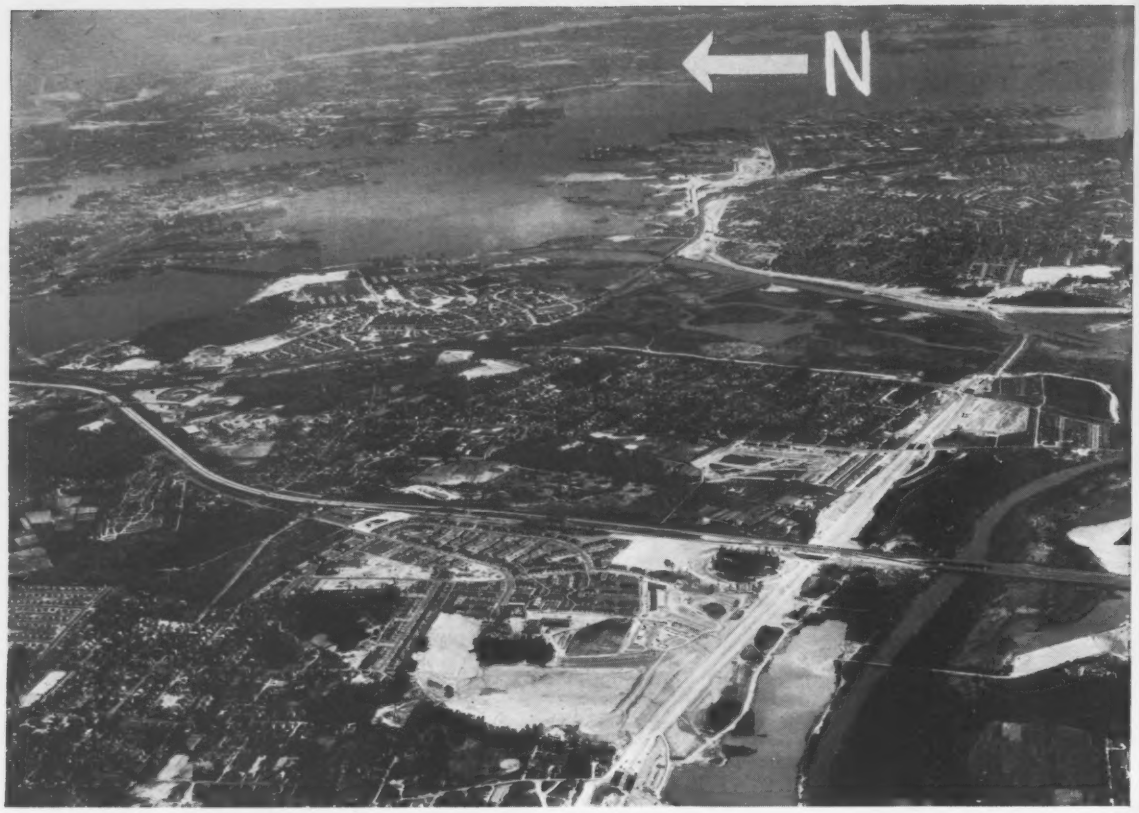
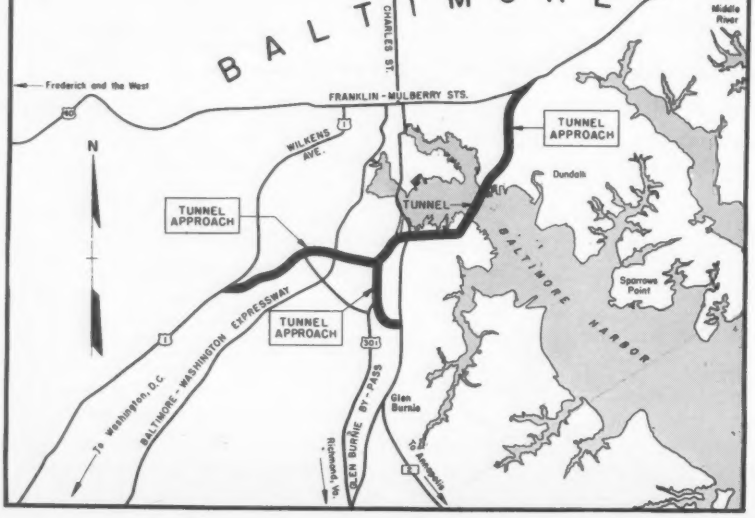


THE WHOLE STORY of efforts to move traffic quickly through Baltimore and its sprawl of suburbs is visible in map and picture above. Tunnel will cross Patapsco River at upper center of photo, and with approaches, provides clear running on controlled access highways from northeast to southwest sides of city.



Swath Take

Given no better than an even break on the weather and on the materials supply situation, Baltimore should have its new tunnel under the Patapsco River —and a good part of the roads leading to it—functioning by late December.

Under construction since about April, 1955, the $130 million job is a major key to an elaborate plan aimed at easing the city's chronic traffic jams—a situation brought about by the thick clustering of industrial and older residential areas around the three principal arms of the placid Patapsco (ENR April 19, 1956, p.58).

After somewhat more than two years of construction work, Baltimore's biggest unscrambling operation stood this way in mid-July:

• All but three of the 21 twin tube sections for the 7,650 ft tunnel under the Patapsco had been floated out and sunk into place in a deep underwater trench. The remaining tubes—fitted out for sinking—awaited completion of work on the trench, and are expected to be in place by the end of August.

TUNNEL comes up for air in slip at center of photo, with north side ventilation building offset to left of cut-and-cover section.

WHOLE BLOCK of Baltimore's famous row houses has disappeared to make room for northern approach road.

ke Shape Through Baltimore's Traffic Maze

• While work on placing the final tubes goes on, workmen have opened up most of the tubes already placed, and are rushing with finishing work inside, including tile, casting of the upper ceiling invert and installing wiring.

• The ventilation buildings on both sides of the river are nearly complete as to structure, and work on installing fans and other equipment, and completion of architectural details is going ahead rapidly.

• Work is going ahead full blast on the roughly 16 miles of principal approach roads and the many structures that are part of them—including an unusual quarter-mile-long K-truss bridge over a railroad yard near the south entrance to the tunnel. Approach work, overall, is about 70% completed.

• And parts of the $40 million circumferential "Beltway"—which, with the tunnel approaches will form a rough circle around the city—are already in use, other parts are under construction. (The entire Beltway system is scheduled for completion by 1965.)

A total of 14 prime contractors (and several dozen subs) are at work on the 22 contract sections that cover the tunnel itself and its approaches.

• **Tunnel moves**—Most spectacular—though least visible to the general public—is the progress on the underwater tunnel itself, key to the whole project. At one stroke, completion of the tunnel will eliminate miles of circuitous travel on city streets now necessary to get around the three principal arms of the Patapsco, and cut travel time through the city (a near must for north-south traffic between Washington and New York) from more than an hour to a matter of a few minutes.

The big underwater passage will be by far the largest ever built by the trench method. Its length will be made up of 21 twin-tube steel sections, each 300 ft long, and each of the two tubes being 33 ft in diameter (there is some variation—a matter of inches—in the diameter, depending on anticipated pressures where a tube is place).

The tube sections rest in an underwater trench, 70 ft wide at the bottom, cut by floating dredges to proper depth, then backfilled with a 2 ft layer of selected sand and gravel to serve as a portion of this trench is 103 ft below bed. To provide clearance for a future 50 ft channel at midstream, the deepest mean water level (the tide differential in the Patapsco is slightly over 1 ft, and there is nearly no current at all).

• **Dredging problem**—It was in the final dredging that Merritt, Chapman & Scott—which holds the general contract for the tunnel itself and for the foundations for one of the ventilation structures—and its dredging subcontractor, Arundel Corp. of Baltimore, ran into difficulties that have caused a delay in the placement of the last four tube sections.

The difficulties were concerned with the uncovering of very hard material and some thin strata of rock at a depth of about 80 ft below the water surface. The rock is a low-grade iron-ore bearing

VENTILATION BUILDING, brick faced over concrete, straddles southern tunnel portal, will house some offices as well as fans.

SOUTHERN PORTAL of 4 lane tube was nearly complete in early spring, while steel framework of ventilation structure was being erected.

lime formation, which may be found in the area around Baltimore, according to engineers, occurring in sheets or layers that sometimes are as much as several feet in thickness.

With a number of the big tubes already in place, and because of the very heavy ship traffic in the river, blasting was ruled out. Final answer, developed by Arundel, was a 17 ton steel "chisel", hung on the end of the dredge boom in place of the bucket, and dropped repeatedly to chip out the rock layers as they were encountered. An orange-peel dredge bucket followed the "chisel" to clean out the muck.

The process was necessarily slow—production of material fell as low as 250 cu yds per 8-hour shift on some days—and meanwhile, the remaining four tube sections were completed at the outfitting dock and floated out into the stream. Floating with slightly more than a foot projecting above the water, the huge double barrels are moored in a protected spot downstream, awaiting final placement.

Otherwise, according to Grover Denny, MC&S project manager on the job, the work has gone smoothly enough. Unlike shield-driven tunnels, the Patapsco tubes are much more than half completed when they are placed in the river. And as soon as torches cut through the connecting bulkheads, finishing crews can go to work despite the fact that the tunnel is not complete.

First step, after the tubes are opened up, is to pour the ceiling invert—a 6 in. slab, which increases to 12 in. at the center section. As in most conventional tunnel operations, the ceiling slab is cast atop telescoping movable forms, which are first lined with the facing tile that will form the surface of the ceiling. Some minor difficuty has developed here in making the tile adhere to the concrete—the slab and its reinforcing is too thin to permit vibration of the concrete, hence occasional voids occur, and the tile drops off on removal of the form. This has not been a serious matter, but does occasion re-working some small areas to re-fix the tile.

Another problem involving hand labor is the matter of exposing the dowels that tie the ceiling slab to the sidewalls. The sidewalls and the entire 20 to 24 in. thick inner concrete lining of the tube (along with the floor slab) is cast while the tube is in the outfitting dock, before it is placed under water.

Because of the curvature of the wall at the springline, the contractor found it impossible to adjust his steel forms to permit the steel dowels to remain exposed—and so bent them flush with the tunnel wall, and cast them into the wall concrete. After the tube is placed and opened, workmen with chip hammers must go through, chipping away the concrete covering the dowels, then bending the dowels outward for the bond with the ceiling.

As of mid-July, 18 tubes had been placed—15 from the south side, 3 from the northern (Canton) side. Thirteen of the southerly sections had been opened and finishing crews were at work in them.

Original plans called for brick pavement, but a decision now has been made to construct the pavement of bituminous concrete over the reinforced portland cement concrete base.

• **Land sections**—On the north side of the tunnel, the approach road plunges through the yards of the Canton Railroad, over two other railroads and then through a heavily built-up residential and small business area, all the way to a junction with the Pulaski Highway (U. S. 40).

Much of this section will be carried as a depressed roadway, with structures at every intersection to provide for local streets. Problems for C. J. Langenfelder & Son. Co., Inc., of Baltimore, Wright Contracting Co. of Columbus, Ga., Square Construction Co. of Baltimore and McLean Contracting Co. of Baltimore—who hold prime contracts aggre-

gating more than $19.6 million for the roughly 4½ mile section to the tunnel portal—are quite typical of big-city construction work anywhere. Heavy local traffic must be maintained during construction operations, and utilities of every description must be moved but kept in full operating order.

Fortunately, there is little rock excavation in the section—excepting for the occasional sheets of "limeinite" similar to those found in the tunnel trench. Most of this can be handled by jackhammer or headache ball. No blasting has been necessary.

• **South side**—On the south (Fairfield) side of the tunnel, the approaches cut through an industrial area immediately surrounding the river, and move quickly into what can pass for open country in an area so well urbanized as that between Baltimore and Washington, D. C., 40 miles to the south.

Work here—in addition to innumerable structures to carry local roads and eight major interchanges—involves two sizeable structures. One is over the growing B&O yards not far from the tunnel portal. The other is over the Patapsco River itself in a swampy area well upstream of the bay area.

The K-truss designed to cross the yards (see next page) is on a 45 deg skew, and contains two principal spans, one of 516 ft and one of 451 ft in length, and will cost more than $3 million.

The bridge over the Patapsco is not a major structure in the sense of its length or weight, but it is unique in its design. Of conventional girder-and-beam design, it has an overall length of 2,380 ft between abutments.

But the 478 ft of bridge carrying the west approach expressway over the stream is supported on piers, each consisting of three individual pile clusters.

The center cluster consists of a total of nine piles, three driven vertically and six radially on 1:4 slope. The cap on this cluster is a reinforced concrete slab 8 ft square and 4 ft thick.

The two other clusters that make up each pier consist of 6 radial piles, battered on a 1:4 slope, and topped by a triangular cap with rounded corners, having two sides of 8 ft 8 in., and one nominal side of 10 ft, and a cap thickness of 4 ft.

All piles supporting the structure are steel H bearing piles. Piles that form the clusters of the river piers are 57 lb 10 in. steel H bearing piles, about 70 ft long, and encased with a galvanized wire fabric-reinforced concrete cover, extending from 1 ft below the mud line to the caps. The encasement, with about a 20 in. diameter, was formed by paper forms, slipped over the outside of the steel piles.

TUBE NO. 14 for underwater section floats nearly awash, awaiting final positioning and sinking. Towers affixed to tubes serve as guides for exact positioning.

INSIDE WORK starts with welders, here burning out bulkheads that seal tunnel sections during outfitting and sinking operations. Finishing operations follow.

PILE CLUSTER supports are features of bridge carrying main southern approach across upper reaches of the Patapsco, where long approach structure is necessary because of swamp.

Transverse floor beams rest on bearing shoes atop the three capped pile clusters to complete the river piers. Wide flange steel longitudinal stringers with cover plates frame in to the pier floor beams to carry the bridge.

The longitudinal span lengths of the portion of the bridge over the stream are 50, 56 and 65 ft.

The bridge, part of a major interchange, will carry the approach road southwestward to a major junction with the Baltimore-Washington Expressway, and end at the old Washington Boulevard (U. S. Route 1).

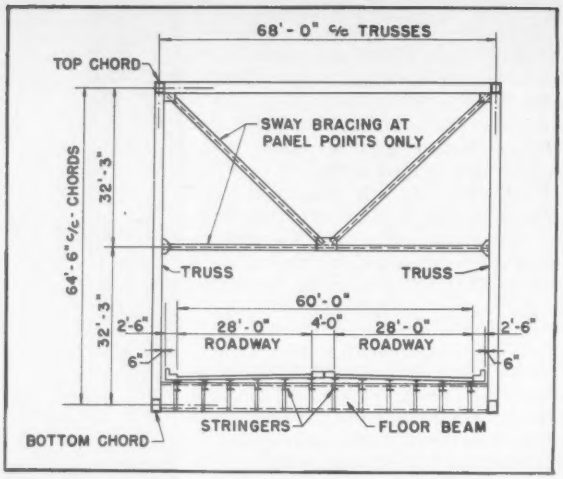
Most of the rest of the southerly tunnel approach is a major earthmoving operation, with a total of about 7.7 million cu yd to be moved over the 10 mile distance. The earthmoving has had an effect on surrounding land values—at one point, where an entire hill was cut away for fill, a brand new housing development and shopping center is springing up.

Eight prime contracts, totaling more than $27.2 million cover this section.

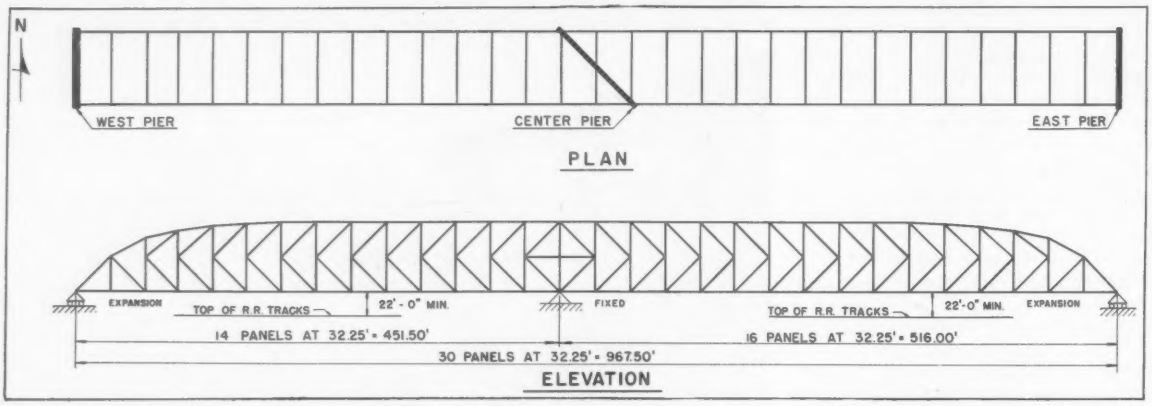
The J. E. Greiner Co. of Baltimore is consulting engineer to the Maryland State Roads Commission, which is the owner of the whole project. Norman M. Pritchett is chief engineer for the commission, and Walter C. Hopkins, deputy chief engineer, serves as liaison engineer on the work.

Because of the state's ownership—with no intervening authority or commission—financing of the tunnel is tied in with the three other state-owned toll facilities: The Chesapeake Bay Bridge, the bridge at Havre De Grace and the Potomac Bridge. Original plans called for a 35 cent toll for automobiles, with truck rates graduated upward to 85 cents. However, recent road commission announcements have indicated that the tunnel toll for private vehicles may be upped to 40 cents or more, with the hope that the present $1.40 toll on the Chesapeake bridge can be reduced.

TRUSS BRIDGE on Baltimore highway is K-type, with verticals braced at midheight by the diagonals.



WIND BRACING is normal, as shown in cross section, though the center pier of the continuous trusses is skewed.



K-Truss Carries Highway over Railroad

Through trusses for highway bridges have become a rarity in recent years because of the desirability of unobstructed views for motorists crossing them. But for several reasons, an approach to the Baltimore Harbor Tunnel will span the nearby Baltimore and Ohio Railroad classification yard on a through-truss bridge.

The main members of this bridge are K-trusses—also a type not seen frequently. Furthermore, they are continuous over two spans.

One of the major considerations leading to the selection of this type of construction was the restriction placed by the B&O on pier location. The railroad allowed only one pier in the 1,000 ft long area, and this pier had to be skewed 45 deg, to fit between existing tracks and a large sanitary trunk sewer.

Tied arches could not be used, the designers report, because they would have required portals skewed at 45 deg at the center pier, as well as top-chord wind bracing varying from 45 deg skews at the center pier to zero at the ends. In addition, either extensive falsework would have been needed for erecting the arches or foundations capable of taking large lateral forces.

The 516 and 451 ft spans needed made continuous trusses desirable, because of convenience of cantilever erection, greater rigidity of structure, economy of material and labor, normal wind bracing and portals (obtained by carrying top chords of both trusses parallel over the skewed center pier), and a low silhouette. (The last was wanted because the bridge clears the yard by an average of 23 ft. Two-span continuous trusses gave the lowest possible structure.)

The K-truss was chosen, the designers say, because secondary stresses are low and there is no need for short struts as would be required for trusses with subdivided panels. Panel lengths set by the center-pier skew and truss-depth requirements resulted in web members on a desirable 45 deg slope.

The riveted trusses are constructed of structural and low-alloy steel. They are supported at the center pier on a fixed bearing and at end piers on rocker-type expansion bearings. The reinforced concrete piers, in turn, rest on 100 ft long steel H-piles.

The deck, designed for composite action with I-beam stringers, is a concrete-filled steel grid with bituminous topping. The stringers span 32 ft between 6 ft deep plate-girder floorbeams at truss panel points.

Whitman, Requardt & Associates, consulting engineers, Baltimore, designed the $2.5 million bridge.

Material Quantities:

Material	Location	Tons
Structural steel	K-trusses	1,950
Low-alloy steel	K-trusses	460
Structural steel	Deck framing	1,275
Steel castings	Truss bearings	55
Total		3,740

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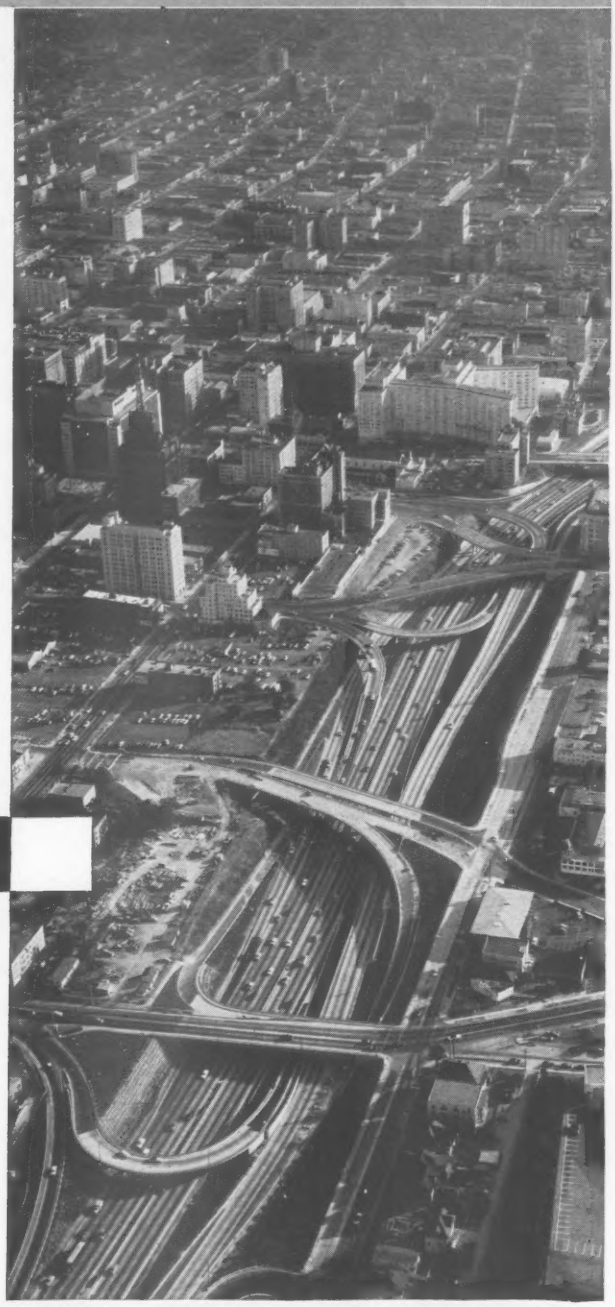

A southerly view of a recently completed section of the Harbor Freeway, U. S. Highway 6, Los Angeles

Designed by the California Division of Highways

Contractor: Winston Bros., Monrovia, California

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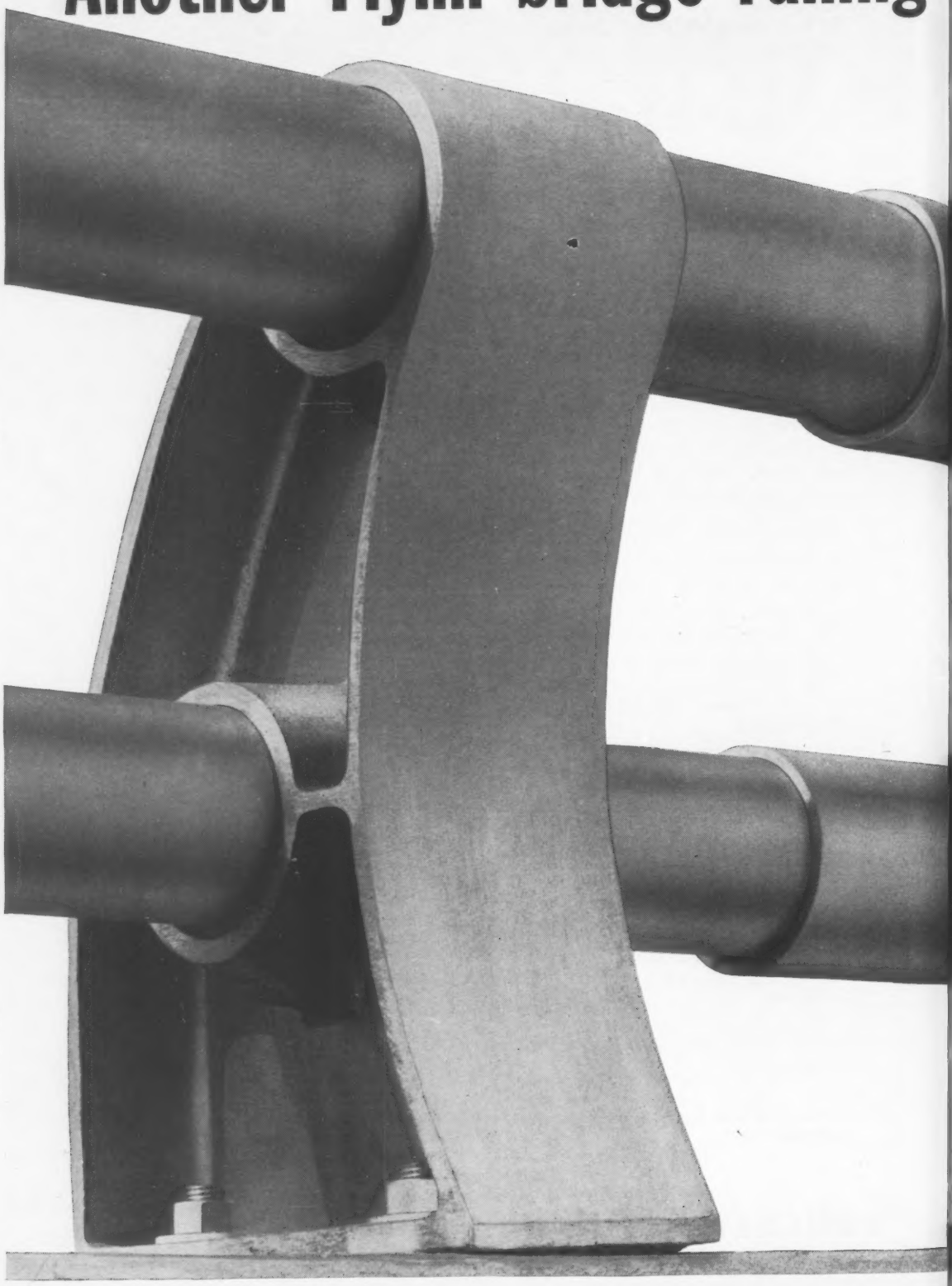
Another Flynn bridge railing



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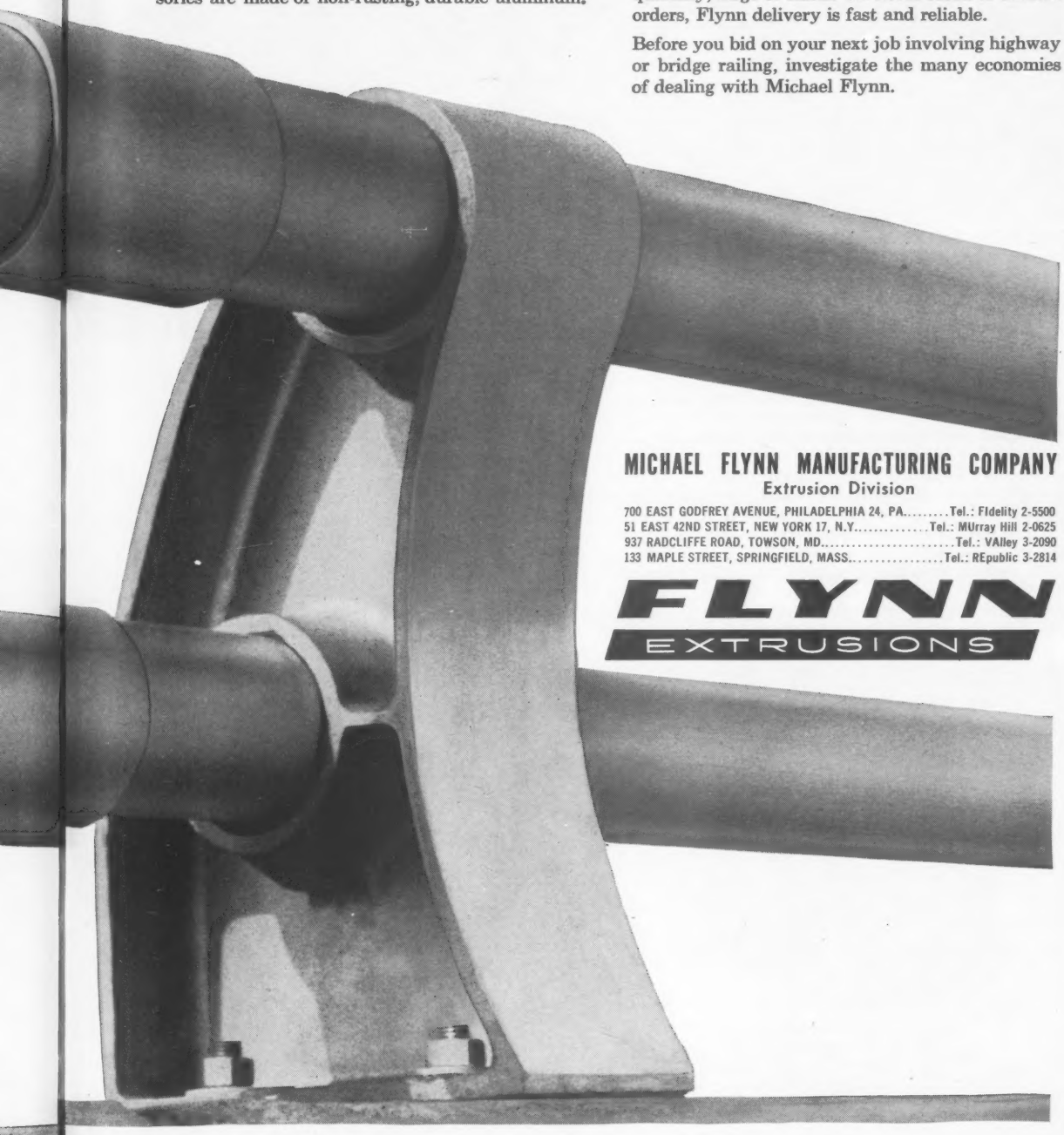

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EXTRUSIONS

CONTINUOUS PLATE-GIRDER BRIDGE over the Save River at Belgrade, Yugoslavia, with world's largest span, is unusually light for its length because the top flange of the girders is also the roadway deck.

Plate Girder Bridge Sets Record with 856

A highway bridge built over the Save River at Belgrade, Yugoslavia, has smashed all records for plate-girder spans. The main span consists of two parallel girders 856 ft long.

The record-breaking girders are part of a three-span continuous section of the bridge. They are flanked by 246 ft side spans. About one-third of the structure is welded, the rest riveted.

An unusual feature of the design is the common top flange of the two girders. A steel plate ranging in thickness from 0.4 to 1 in. extends 40 ft between their webs. It also serves as the top flange of floorbeams, which are spaced about 5 ft apart. The plate carries the pavement directly on its top surface.

• **Former recordholders**—The Save River Bridge beats by more than 200 ft the span of the previous recordholder—the Bonn-Buel bridge over the Rhine. A 1,263 ft steel box girder, that structure incorporates a 643 ft span.

It is also interesting to compare the new bridge with the Cologne-Deutz crossing over the Rhine. That steel box girder has continuous spans of 435-607-407 ft and also carries the pavement on the top-flange plate (ENR Feb. 2, 1950, p. 47). The pavement is a concrete slab 5 in. thick, which transfers shear to the flange plate through spiral rods welded to the plate and thus with the steel sections form a composite girder.

In contrast, to keep the weight down, the top flange of the new bridge carries an asphalt pavement only 2 in. thick. The contractor believes the asphalt will not strip from the metal deck.

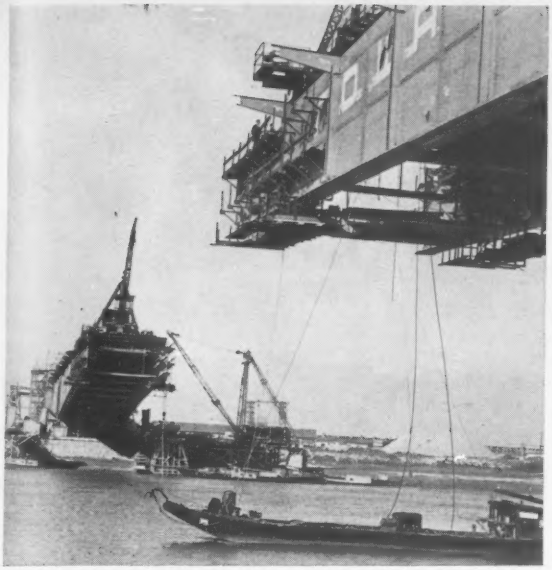
The record-breaking girders are more than double the span of the longest in the U. S. The New Jersey Turnpike crossings over the Hackensack and Passaic Rivers have main spans of 375 ft (ENR Jan. 17, 1952, p. 30), and a Connecticut Turnpike bridge now under construction over the Quinnipiac River will include a 387 ft span.

• **Steel saving**—The Save River bridge —between Belgrade and Zemun— replaces a suspension bridge that was destroyed during World War II. However, some piers and other parts were re-used for the new structure.

The new design made it possible to cut the weight of superstructure from 7,500 tons for the old bridge to 4,200 tons.

• **Novel design**—The 246-856-246 ft girders carry a 40 ft roadway flanked by 10 ft cantilevered sidewalks. The

GIRDERS were erected with bottom flange attached: 40 ft top flange was added later.



CANTILEVERED from both shores, the girders were erected by a derrick on each end. Sections added weighed up to 27.5 tons.

GAP CLOSURE between the cantilevers was accomplished by one derrick. Meanwhile, the anchor arm rose off its temporary supports.

856-Foot Span

girders are located along the edges of the roadway. At 5 ft intervals, they are braced transversely by floorbeams; at 30 ft intervals, by rigid frames with horizontal tie at the base (see typical half section), and at piers and near quarter points, by plate diaphragms (see half section at pier).

Allowable unit stresses up to 34,000 psi (German Standard DIN 1073) were used for the design of the low-alloy, St52 steel girders (51,200 psi yield point). Live loads were assumed to be a single 66 ton, 6 wheel truck or four 14.3 ton trucks and a uniformly distributed load of 70 psf. Wind pressure was taken as 50 psf in the loaded condition and 18 psf, unloaded. Temperature range assumed was 35C.

Depth of the 856 ft girders varies from 14 ft 9 in. at midspan to about 31 ft 6 in. at the piers. The web plate, spliced at intervals of 8 to 10 ft horizontally and about 30 ft vertically, is 0.56 in. thick. It has several horizontal stiffeners (on its inside face), as well as vertical ones at intervals of about 30 ft. The 40 ft wide top flange is stiffened on the underside by longitudinal steel-plate ribs spaced 12 in. c-c.

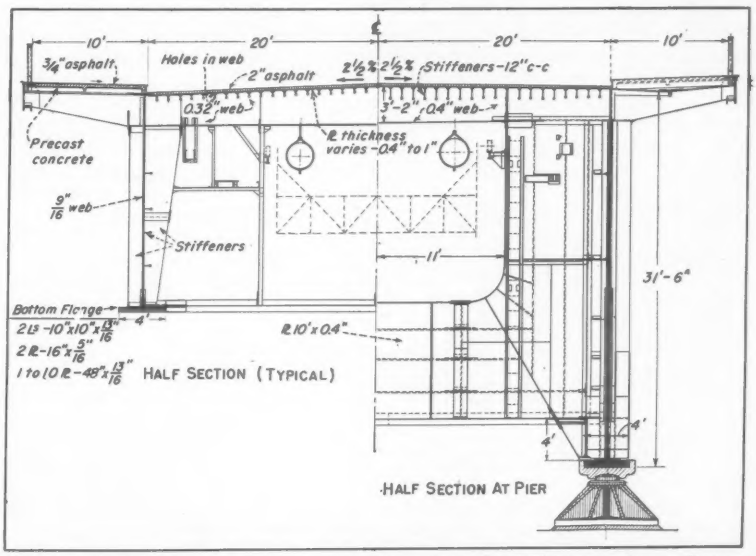
Though the girders share a common top flange, they have conventional bottom flanges consisting of two angles and several cover plates (10 at the piers). However, these plates are 4 ft wide.

At the abutments, the anchor arms are tied down to resist uplift of about 700 tons.

• **Cantilever erection**—In the construction of the bridge, the anchor arms were assembled on temporary bents. The main span was erected by cantilevering out simultaneously from opposite shores. During this procedure, the girders were tied back to the abutments.

The girders were erected in sections weighing up to 27.5 tons by a rail-mounted derrick on each cantilever. The top-flange plate was attached as the girders were extended. When completed, the girders were jacked up 32 in. at the abutments to introduce positive bending moments into the anchor arms.

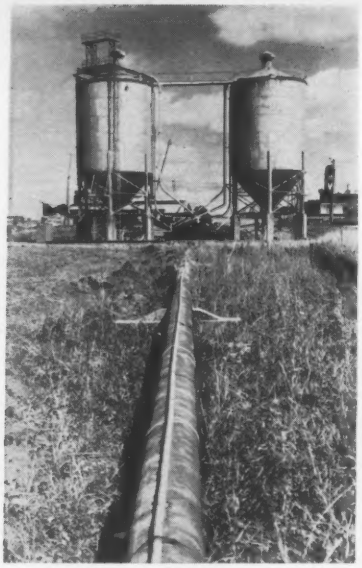
Maschinenfabrik Augsburg-Nurnberg AG, Gustavsburg, West Germany, designed the bridge, supplied the steel deck and some of the heavier erection equipment, and planned and supervised construction. Djuro Jakovic, of Slavonski Brod, and Dragoslav Georgevic, of Gosa, fabricated the girders, while Mostogradnija of Belgrade erected them. (These are Yugoslav state enterprises.) Bozidar Kalajdic was the engineer in overall charge of the work for Yugoslavia.



MAIN GIRDERS carry the roadway pavement on the stiffened 40 ft top flange. Bottom flanges are conventional; they consist of two angles and cover plates (as many as 10).

PNEUMATICALLY UNLOADED by remote control, bulk cement is moved . . .

. . . **FROM SHIP** to shore along the Cornwall Canal. Then . . .



. . . **CEMENT IS PUMPED** by pipeline from canal-side to silos.

Air Moves Cement for St. Lawrence Jobs

A materials handling technique saving money on the St. Lawrence power project is the pneumatic movement of cement. Air is used to unload ships, then take cement by pipeline from storage to batching plant.

Ships are unloaded at a dock on the old Cornwall Canal near the Canadian end of the St. Lawrence Power Dam, and the cement is piped about a mile—across the international border—to the U. S. end of the powerhouse.

Bulk cement is also handled pneumatically from rail unloading points for other features of the project, but these handling facilities are not of such unusual extent as is the ship-delivery facility. Incidentally, this ship-hauled cement, conveyed by pipe to the U. S. powerhouse contractor's silos, is also trucked from there to the Long Sault Spillway Dam, being built upstream by the same group of contractors in joint venture.

Pneumatic conveying provides a high-capacity method for handling tremendous tonnages of cement, according to the builders. And the automatic nature of pneumatic conveying makes the system especially attractive cost-wise. Besides minimum labor requirements, material losses are practically non-existent.

The dock-to-dam pneumatic system, plus systems at the Long Sault Dam and at the site of the Canadian side of the powerhouse, were designed by Fuller Company, Catasauqua, Pa.

• **How it works**—At the unloading dock on the Cornwall Canal portland cement shipped up the St. Lawrence River from Quebec City by Canadian freighters is unloaded and pumped to either of two silos, 426 ft from dockside, by two portable, remotely controlled unloaders. They empty a 2,700 ton shipload of cement in 24 hours.

These 5½-ton unloading pumps are mounted on two wheels, each wheel driven independently in either direction by a separate 3 hp motor. Other motors power the feeder disks that rotate slowly, picking up cement and feeding it into the open end of a screw barrel. Compressed air is admitted through an air ring just beyond the final flight of the screw. Rotary compressors, operating at a pressure of approximately 40 psi, supply air for the operation.

Control equipment is enclosed in a dust-tight cabinet. An armored wire cable leading from a terminal block in the control cabinet terminates in a hand switch or "wand" carried by an operator.

By tilting the wand, the operator controls the direction of the movement of the wheels, making the unloader move forward, backward or to either side, wherever there is cement to be picked up.

Cement from the shore silos goes to either of two stationary 7 in. pumps (one is a spare). The pumps convey the cement through a 10 in. pipeline 4,200 ft across the dewatered north channel of the St. Lawrence to two silos at the batching plant at the U. S. side of the powerhouse. (Railroad cars deliver natural cement used in the concrete here to a third silo.)

Portland cement is conveyed into the batching plant by bucket elevator. In an emergency, a pump can be switched to perform the same transfer operation.

At the Canadian end of the powerhouse, portland cement taken from hopper bottom cars is pumped by a 7 in. pump about 1,800 ft through an 8 in. steel pipeline to either of two silos at the batching and mixing plant. Conveying rate is about 300 bbl per hour. The pipeline travels through conduit under the existing Cornwall canal.

• **Pneumatics not new**—Pneumatic conveying of cement has been employed in such major dam construction projects as Grand Coulee, Shasta and Hoover dams. These projects used pneumatic systems for conveying cement from rail siding to batching plants on the jobsite.

Although pneumatic conveyors have been used to convey cement over long distances before (7,600 ft at Grand Coulee Dam), they have never been used to such an extent, employing so many varied forms of handling, on such a complex network of operations, as they have on the St. Lawrence power project, say the equipment manufacturers.

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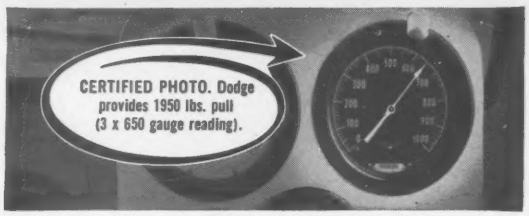
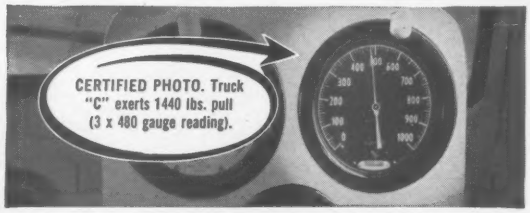
DODGE

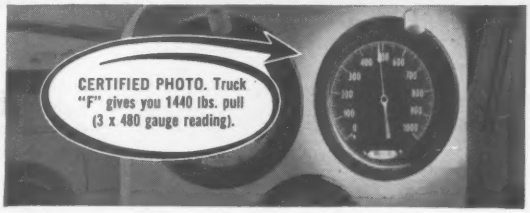
PowerGiants



DODGE and competitive trucks were tested for pulling power by towing a special dynamometer truck. Gauges measure maximum pulling force exerted. To convert this force into pounds, gauge reading is multiplied by three.

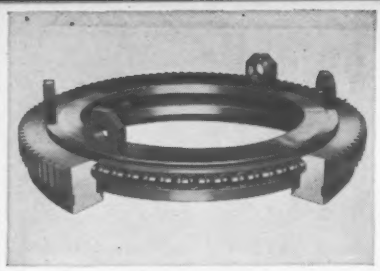


TRUCK C, pulling the same dynamometer truck as the Dodge, was unable to equal the Power Giant mark in repeated tries. Gauges show Dodge outpulled Truck C by 32%.



TRUCK F in its turn pitted all its pulling power against the Dodge, to no avail. The sealed, accurate gauges reveal clearly that Dodge offers most "pull power" of the low-priced 3.

MOST POWER OF THE LOW-PRICED 3

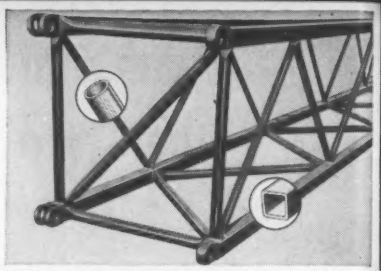


"SHEAR-BALL" TURNTABLE MOUNTING*

Turntable is secured to crawler and revolves easily and freely on a huge sealed "ball bearing." No center pin or nut, centering gudgeon or exposed roller path . . . no turntable rollers . . . no constant adjustment, maintenance or lubrication problems.

2-LEVER, "JOY-STICK" AIR CONTROLS

The newest and most effortless of all shovel-crane power controls. "Metered Air" feeds power to clutches at any rate desired — yet operator retains full "feel" of all operations. Fewer levers, fewer motions, faster, smoother, less effort, less fatigue, more output.



SQUARE-TUBULAR-CHORD BOOM*

This new patent-applied-for design has startling advantages over conventional types. Reduces weight and increases lifting capacities. 30-ton crane capacity on 14-ft. long x 13-ft. wide crawlers . . . up to 100-ft. boom, plus tip extensions available.

*U.S. and foreign patents applied for.

In the LORAIN-56 too the BIG 3 make money for you!

Just like the big 2½-yd. Lorain-85A, the fully convertible 1¼-yd. Lorain-56 gives you the 3 big Lorain features that will mean more profits on any job. You get greater operating ease, longer life, higher production, reduced maintenance . . . plus increased crane capacities with these "Big 3" features.

There are many other "56" advantages, too, that make it an exceptional value in the 1¼-yd. class. Here are a few: full air control of crawler operations . . . hoist and swing drums and travel shaft on anti-friction bearings . . . torque converter power-take-off . . . choice of two crawlers . . . crane capacities up to 30 tons available . . . a new, interchangeable hoe with dipper widths from 36" to 48" . . . and there are many more.

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Building Failures Alarm Rio

"If Rio were to get even the slightest earthquake or a hurricane, half the city would tumble down like a house of cards."

This is the ominous prediction of an engineer in the Brazilian capital, where a disastrous building failure early this year stirred up a hornet's nest in the local press.

After the 11 story Rua Rosario building caved in and killed nine persons last February (ENR May 9, p. 75), Rio papers began searching for other periled buildings. Their reporters have tagged an impressive number as leaning and shifting.

The magazine, O Cruzeiro, listed 20 buildings that have collapsed in Rio de Janeiro in the past 10 years. "More will follow," the publication added.

To support its forecast, O Cruzeiro ran pictures of several leaning buildings, some 8 to 12 in. out of plumb at the top, on Rio's two biggest streets, Avenida Presidente Vargas and Rio Branco.

None of the leaning structures have been condemned by the city. However, the municipal government moved its furniture from a building on discovering that both the building in question and an adjacent structure were leaning. Officials of another leaning building hastily covered up the separation between their building and its neighbor.

City engineers, in declaring the buildings safe, claim that the structures have been leaning for some time. The occupants, the engineers complain, have become panicked by the magazine and newspaper stories. Contributing to the feeling of insecurity of the occupants, no doubt, is the report that a city engineer declared the Rua Rosario building safe only 30 minutes before it collapsed last February.

Engineer Domingos Pontes Vieira, of the Instituto Nacional de Tecnologia, singles out poor soil bearing conditions as the actual cause of the trouble. But he blames both the city administration and the building designers for the situation that exists.

He said the affected part of the city used to be a beach. Ground water lies only 8 or 10 ft below grade, and the resulting water subsoil is the cause of the building movements. The Rua Rosario building collapsed after a neighboring construction job had sucked the water and wet soil away from its foundations, Vieira explained.

When buildings as high as 22 stories are erected on weak subsoil, the engineer is at fault, declares Vieira, and the city also is at fault for permitting him to do the job.

Laws are too lax, he claims, and there are too few city engineers to permit adequate inspection, O Cruzeiro's list of 20 collapsed buildings is made up of structures that were designed poorly or were built with inferior materials, Vieira points out. When soil settlements began shifting buildings, these faulty ones collapsed.

While the February collapse stands as the worst such accident, another fatal crash occurred only a few weeks ago. Rainwater collected in the cellular construction of a partly completed reinforced concrete marquee for a new stadium and brought the cantilever marquee down, killing one workman and injuring several others.

Vieira supports the city engineers, however, in their decision not to condemn the leaning buildings in the Avenida Vargas sector. The structures are settling uniformly, without carcking, he says, and are relatively safe.

Eastern Publishers Service photos

Cattle Take Over from Machines

Nearly 1,000 head of cattle are being used in the Fadhli area of the Western Aden Protectorate, on the Arabian Sea, to construct an emergency deflector dam urgently needed to irrigate fields in the Jol area. The age-old method had to be adopted when, owing to heavy and repeated floods, machines were unable to put up the deflector. The cattle pull rudimentary slip scrapers to pile up earth into an embankment that will be the dam.

Venezuela's Avenue of Heroes

Forming a broad vista leading to the backdrop of mountains surrounding the city is the newly opened "Avenue of Heroes" in Caracas, Venezuela's capital.

The Plaza, 800 ft long, includes six reflecting pools, 84 flower urns, an obelisk 50 ft high and dozens of statues and fountains.

(Continued on page 52)

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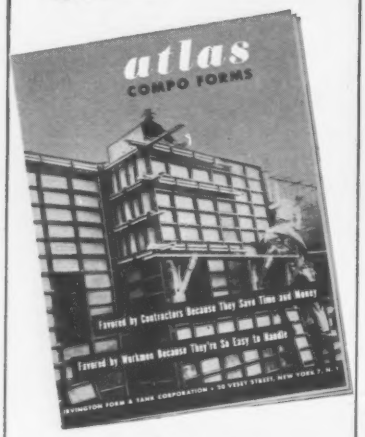
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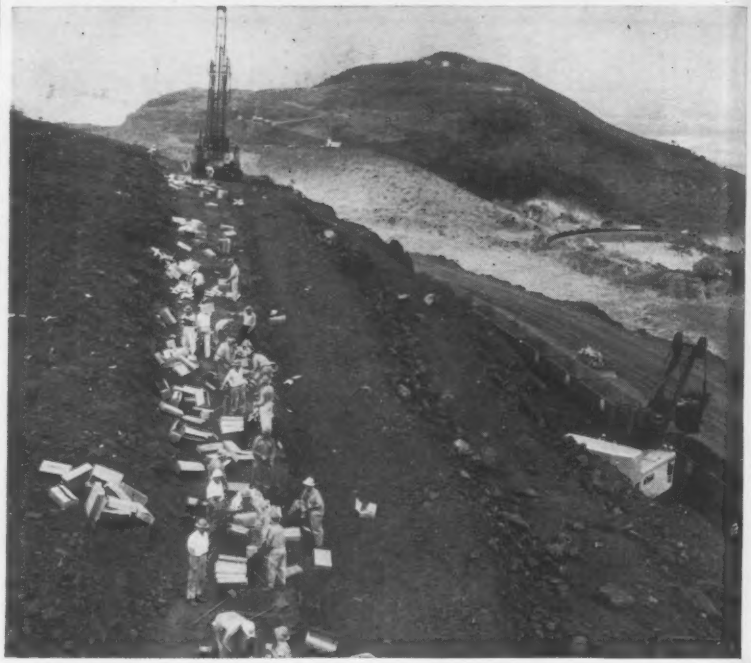
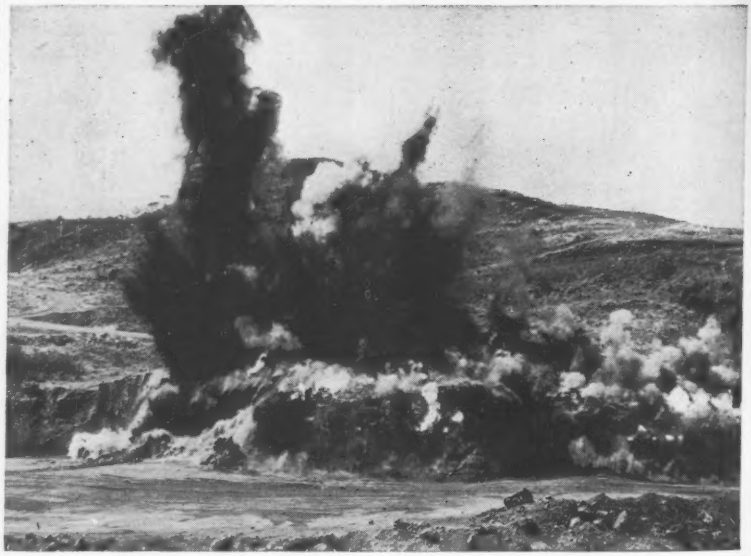


Students Line Up Explosives . . .



. . . for Blasting Lessons

The huge new Cerro Bolivar open-pit iron mines in Venezuela also are serving as a unique school for blasting technicians.

In the upper picture explosives are lined up for the blast (below) that will loosen additional tons of ore in one of the world's richest known deposits.

Supervising the work is Hugh Bren-

(Continued on p. 54)

South Bend, Indiana, got its money's worth in this new $5,587,000 sewage disposal plant, built with the protection of an INA performance bond. Sollitt Construction Co., Inc., was the contractor.

CONTRACT WON...

INA's extra value helped to lower bid

When the bids are in and the qualifications compared, the winning contractor is often the one who has successfully economized in small ways. It is 'extra value' for the contractor if he can economize without sacrificing quality of service.

The contractor realized INA's extra value in a performance bond of Indemnity Insurance Company covering the disposal plant above. It was arranged through the local independent agent. Indemnity, with its broad bonding experience, formulated a plan to assure minimum rate. This resulted in a saving to the contractor equal to more than one-third of the difference between the successful contract bid and the next lowest.

This is but one example of extra value in coverage and, for contractors who qualify, minimum rates* and prompt handling of every need.

*Not available in Louisiana and Texas

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...FOR MAXIMUM JOINT PROTECTION IN CONCRETE PAVEMENT

Para-Plastic requires little or no maintenance!

Para-Plastic is the *original* hot-poured rubberized asphalt joint sealing compound that forms a resilient, adhesive and effective seal which maintains bond at sub-zero temperatures. Para-Plastic has unique characteristics of adhesion and cohesion that make it the most efficient joint sealer available today. Unaffected by extremes of temperatures, Para-Plastic insures a moisture-tight seal of expansion, contraction and dummy joints in concrete pavement. Hot Poured Para-Plastic meets Federal Specifications SS-S-164, CAA Spec. P-605, ASTM D-1190-52T, and many State Highway Specifications.

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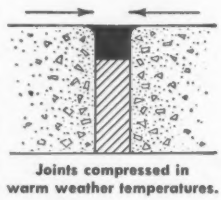
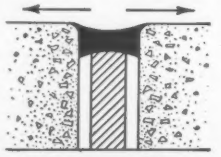
Drawings at right illustrate the unique characteristics of Para-Plastic Joint Sealer during extremes of temperatures. The compound remains plastic at sub-zero temperatures and changes only slightly in hardness and viscosity during higher temperatures. Servicised technicians are available to assist you in waterproofing problems and to make recommendations for installations of a specific nature. Ask for details.



Joints compressed in warm weather temperatures.



Joints opened in sub-zero temperature.

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nan, of Vancouver, B. C., who has spent the last six years teaching Venezuelan natives how to handle explosives in this kind of work. Since the inception of his "school" Mr. Brennan has trained 150 men to handle blasting materials, and eight of these have become master blasters, capable of supervising projects of their own.

Canada to Aid Building An Alaska Highway Link

Construction of a $6 million highway into British Columbia's northern interior will be subsidized by the Canadian federal government during the next four years.

The highway, from Cassiar to Stewart, will open up the province north of the Alaska Panhandle, and connect with the sea and the Alaska Highway.

The subsidy represents an important government contribution to the province's 1957 highway budget of $70 million—third highest provincial total for what the Canadian Good Roads Association predicts will be another record roadbuilding year.

An association survey revealed a 20% increase in this year's road and street budgets for all governments, with the 1957 total budget standing at $861 million against $715 million spent last year.

Provincial highway budgets account for $604 million or 70% of the total ($485 million in 1956). Ontario is leading the field with a proposed budget of $236 million, followed by Quebec with $119 million.

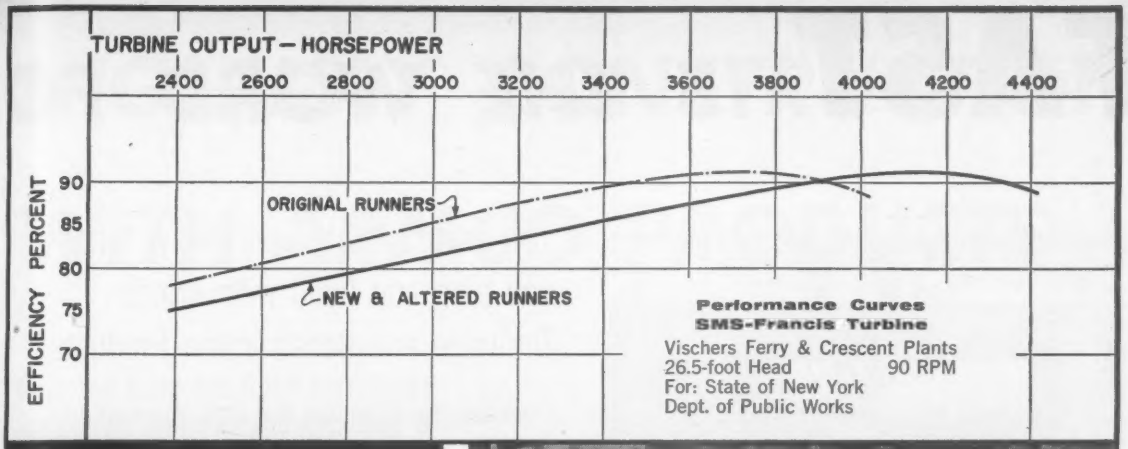
U. S. Contractor Offers $16 Million Highway Bid

The Bolivian Ministry of Public Works has announced a $16 million bid submitted by a U. S. firm for construction of a 210 mile highway to connect Carabuco at Titicaca Lake and Beni at the northeast corner of the country.

Terms of the offer, submitted by Baltimore Contractors, of Baltimore, include:

- $16 million in drafts accepted by the Banco Central of Bolivia on account of Baltimore Contractors, plus interest of 6% with a yearly expiration of $1 million starting in 1959.
- Drafts to be paid, on Baltimore Contractors option, with the value of agricultural exports.

The firm would arrange for purchase of agricultural products by other U. S. concerns as a means of making the payments good.



Modifed runner for Vischers Ferry unit #4. Note excellent condition of runner after long initial service.

The rebuilt distributor of Crescent unit #1 is checked during final assembly in the SMS shops.

Rehabilitation of 34-Year-Old SMS Turbines
TO INCREASE POWER 10%

Here's how hydro plants, operating on relatively low heads, can have rehabilitated turbines to get increased power and higher efficiencies. At the Vischers Ferry and Crescent Plants on the Mohawk River north of Albany, New York, four 86-inch SMS-Francis turbines have recently been rebuilt. Their increased capacity is shown in the curve above.

These SMS runners were in good mechanical condition after an average of 34 years of service. There was no evidence of weakness or failure, no erosion, and very little cavitation. Only minor modifications were needed on the bucket and throat to reshape them in accordance with modern designs and increase their output. SMS furnished a new runner to replace the first one removed, so that by rehabilitating one unit at a time and using the runner as a replacement for the next unit, outage time was kept to a minimum and the last runner has become a spare.

Modernization and rehabilitation of existing facilities can often be the answer to your need for more power at low cost. At SMS, you will find the most modern laboratory, engineering, and manufacturing facilities available. To obtain a general discussion of turbine rehabilitation given at a recent technical presentation, write on your letterhead to S. Morgan Smith Company, York, Pennsylvania.

More Power To . . .

LIVE BETTER ELECTRICALLY

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AFFILIATE: S. MORGAN SMITH, CANADA, LIMITED, TORONTO

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FAST IS THE WORD FO

You save TIME in many ways when you plan and build with Armco Drainage and Construction Products.

Consider, for example, the time you save by eliminating troublesome formwork and curing periods when you use all-steel Armco Products. SPEED also stems from the light weight of easily handled components of many Armco Products like Guardrail, Retaining Walls and Corrugated Metal Drainage Structures. Bolted construction is another of the time-saving features of many Armco Products.

See how these practical advantages can work for **you.** Check these Armco Product installations.

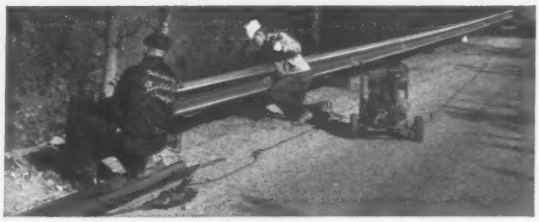
Quick Assembly of Armco Pipe-Arch Helps Make New Bridge in 2½ Days

When the headwalls of this bridge in Monroe, Wisconsin, threatened failure, officials decided to rebuild with an Armco Structure. A MULTI-PLATE® Pipe-Arch (span 8′-10″, rise 6′-1″) was used. A four-man crew assembled the 50-foot-long structure on the bank in just 12 hours. One more day was required to rip out the old bridge, set the MULTI-PLATE in position, and place the backfill. Result: a strong, modern, easily maintained bridge in only 2½ days.

ARMCO

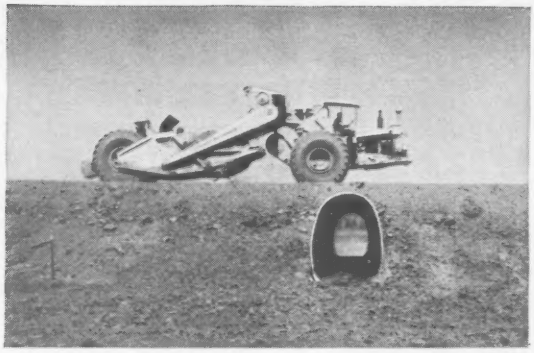
HIGHWAY CONSTRUCTION WITH ARMCO PRODUCTS

Nuts and Bolts Tell Quick Installation Story With Guardrail and Retaining Walls



Simple bolted connections combine high strength with ease of installation for practically every Armco product. Take FLEX-BEAM® Guardrail, for example. Bolts make strong splice connections of 12-foot sections of FLEX-BEAM. Other bolts hold the rail to the posts. There are no troublesome tension devices to install and adjust. A wrench is about the only tool needed.

With Armco Bin-Type Retaining Walls the same advantages of bolted construction work for you. Individual components bolt together at the site to make a strong, integral structure. No welding, no cutting, no waste materials, no formwork, no lost motion.



Structures Can Be Backfilled and Put In Service As Soon As They are Installed

You don't waste time, waiting for curing periods when you use Armco Drainage Structures. Backfilling and finish grading can be done just as soon as the structure is in place. Picture shows heavy equipment rolling over elliptical-shaped Armco MULTI-PLATE being installed under Colorado highway for cattle underpass.

Get Complete Data On Entire Line of Armco Construction Products

Because they are easily and quickly installed, Armco Drainage and Construction Products can play a time-saving, money-saving role in your highway construction projects. Write for details—not only on the Drainage Structures, Guardrail and Retaining Walls shown here—but such Armco Products as Sheeting, Water Pipe, Piling, Steel Buildings, Bridge Plank and Water Control Gates. Armco Drainage & Metal Products, Inc., 5427 Curtis St., Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

Construction Products

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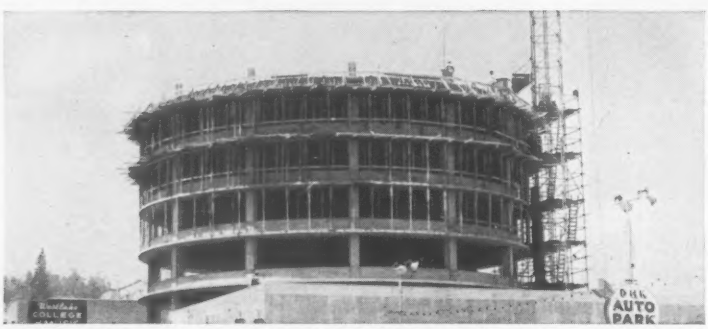
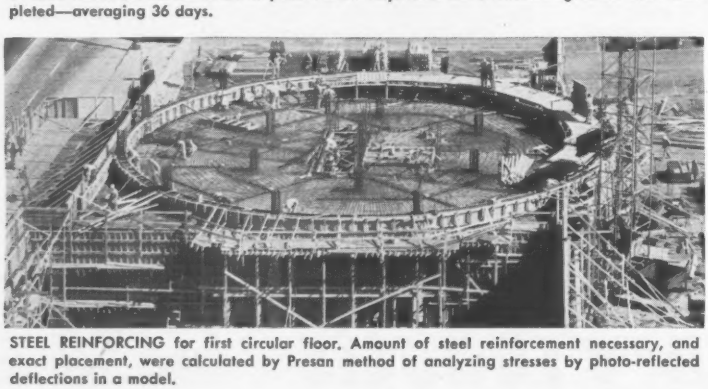
CIRCULAR CAPITOL TOWER resembles loaded automatic record player. Welton Becket, FAIA & Associates, Los Angeles, architects; Murray Erick Associates, Los Angeles, structural engineers. C. L. Peck, Los Angeles, contractor.



PLYWOOD SHEETS, with edges accurately trimmed to proper circumferences, form underside of floor disks. Shores remained in place until 7 days after the 3 succeeding floors were completed—averaging 36 days.



STEEL REINFORCING for first circular floor. Amount of steel reinforcement necessary, and exact placement, were calculated by Presan method of analyzing stresses by photo-reflected deflections in a model.

Tower floats on concrete columns

TWELVE DISKS RISING above an 88′ x180′ rectangular base distinguish the unusual yet practical 13-story, reinforced-concrete headquarters building for Capitol Records, at Los Angeles.

Shear walls, employed in the base, are completely lacking above the first story. All loading — gravity and seismic — is taken by two sets of 24″ x 24″ reinforced-concrete columns (12 around the perimeter and 6 girding the core of the structure) and by 8″ thick flat-plat floor slabs. Second-floor disk has 78′ diameter, those above are 90′, creating a definite "floating" effect for upper floors, particularly under night illumination.

Good continuity in concrete work despite unusual job problems, was established by a trained crew and on-schedule delivery of regular 3000 psi concrete, processed in truck mixers of certified design, capacity, mixing speed and water control accuracy.

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CERTIFIED BY THE TRUCK MIXER MANUFACTURERS BUREAU TO COMPLY WITH ITS STANDARDS FOR TRUCK MIXERS AND AGITATORS AS APPROVED BY THE N.R.M.C.A.
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Fog Gives Way to Lighting Researchers

Penn State studies may provide formula for determining safety limits on high-speed roads

Lighting engineers have satisfactorily penetrated fog with automotive and highway lighting equipment.

The job was done by directing light perpendicularly to the driver's line of sight or as perpendicularly as possible in the case of automobile headlights. This was demonstrated recently at Pennsylvania State University and is believed to be the first major breakthrough in close to 100 years of scientific research to pierce the fog barrier.

Before an audience of approximately 50 turnpike officials from 10 states, highway safety experts, lighting engineers, psychologists and ophthalmologists presented the latest results of a series of studies begun 3½ years ago by the Illuminating Engineering Research Institute in an effort to reduce the accidents on the nation's highways.

The studies might result in a formula through which turnpike authorities could determine when to close their limited-access highways, when to order reduced speeds and when to continue operations during fog periods.

Tests showed, according to Charles R. Marsh, associate professor of electrical engineering at Penn State, that it will be possible to increase visibility in fog on the open highway by 100% or even more through light control within the next year and that "we are apparently approaching this level."

It was shown that changing the mounting angles of highway lighting, using low-mounted white fog lights, and polarizing the light sources can successfully accomplish a major improvement in visibility in fog.

• **Fog a hazard**—Fog accounted for approximately 5% of all accidents on the New Jersey Turnpike during the first 2½ years of its operation—a figure that is made more significant by the fact that a sizeable proportion of the accidents involved a number of vehicles, some as many as 26 cars. More than 65% of the fog accidents occurred at night, and 82% were of the same-direction type.

Statistics show it is also a serious accident hazard on all turnpikes and highways on the northeastern and northwestern seaboards of the United States and in the Great Lakes area.

• **Tests made**—Under the direction of the IERI, two cooperating groups of scientists penetrated man-made fog—which has characteristics identical to natural fog.

The tests were staged in a 50 ft Army type medical tent. Three separate types of lighting control were exhibited, each producing a notable, although varying, effect in penetrating a controlled fog barrier. Fog created inside the tent was equivalent to approximately 50 ft visibility on an open highway.

In the first light-control method, overhead roadway lights were mounted so that their beams were cast perpendicularly to the pavement. In the second method, reflecter floodlights were installed on the shoulder of the simulated road and slightly above the pavement level so that the beams fell across the roadway perpendicularly to the autoist's line of sight. In the third method, automobile headlights and fog lights were dropped below the bumper level of the average car and, for maximum effect, were polarized.

"Each of the three fog-penetrating systems demonstrated, clearly proves that the fog barrier can be satisfactorily pierced when illumination is directed perpendicularly to the driver's line of sight or, in the case of auto headlights, as perpendicularly as possible," according to C. L. Crouch, technical director of the Illuminating Engineering Society.

• **Polarizing**—The realistic principle involved is that lighting, whether polarized or not, must be so arranged that the driver's line of sight does not travel along the beam of either his own headlights or of fixed highway lights.

"This can be achieved on the nation's highways by altering the mounting angles of fixed road lights for fog conditions, by equipping cars with low-mounted headlights or with equally low-mounted polarized fog lights—which could be used without other headlights in fog conditions—or by a combination of both methods," according to Mr. Crouch.

He compared polarization of light to the use of a haze filter on a camera. Just as a camera filter screens out certain colors to make a clearer view, so a polarizing filter screens out a certain portion of the light bounced back by fog and reveals a more distinct scene.

The addition of color to fog lamps, according to the lighting scientists conducting the studies, has been found to have little or no effect in increasing the degree of fog penetration.

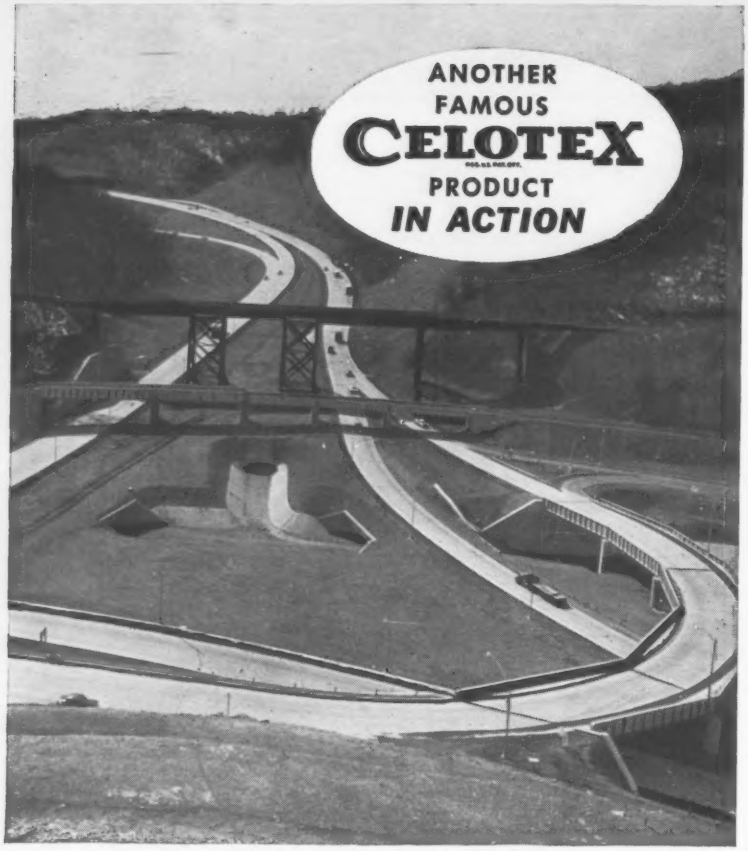
Pieces of inexpensive polarizing material were used in the demonstration to filter the light sources. Maximum benefits were obtained when the resultant light was viewed through a similar filter mounted on a swing-away visor at the viewing point.

Dr. R. H. Blackwell, professor of psychology and director of the Vision Research Laboratory at the University of Michigan, Ann Arbor, and Benjamin S. Pritchard, professor at the Willow Run Research Center at the Ann Arbor institution, also took part in the demonstration.

Dr. Blackwell and his team analyzed the composition and structure of fog and measured the amount of haze barrier created when a beam of light was scattered by fog. Professor Marsh, using the Michigan group's findings, created artificial fog that met nature's specifications and then experimented with test-lighting on a quarter-scale road built into the hospital tent on the back lawn of his home. Through these tests he successfully applied the principle of seeing through fog with the help of light beams falling perpendicularly to the line of sight.

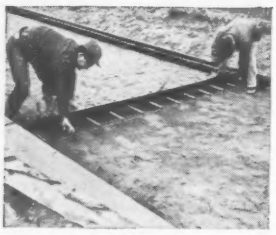
Commenting on the demonstration, Dr. Blackwell declared that present-day lighting on automobiles places the beam almost on the driver's line of sight. Similarly, the practice of mounting highway lights so that the major portion of illumination is cast up and down the roadway at horizontal angles results in directing the main beam at the driver and his line of sight.

"In an effort to derive the greatest possible spread of highway illumination for safe driving under normal atmospheric conditions," he observed, "lighting designers have innocently created the least favorable conditions for driving in fog. In both automobile headlight illumination and fixed lighting on highways, light beams are close to rather than perpendicular to the driver's



Saw Mill Run Interchange on Penn-Lincoln Highway

WHERE AN INCH IS A CHASM!



Typical Highway Installation showing use of dowel bars. Flexcell Bituminous Expansion Joint Filler can be delivered cut to size and fabricated to meet your needs.

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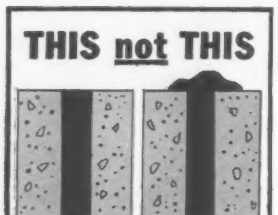

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line of vision. New findings show that this condition must be changed in order to penetrate a veil of haze."

• **Studies continue**—While it is expected that the Research Institute's study program will be continued, and that additional findings will be made, Everett M. Strong, professor of electrical engineering at Cornell University and chairman of the Institute's research executive committee, suggested that corrective measures could be made on the basis of current knowledge.

"Today's demonstration," Professor Strong said, "is in the nature of an interim report. It is intended to present findings thus far in our studies rather than to recommend the most beneficial correctives. But it is reasonable to believe that the lighting principle now evolved could be put to a practical, full-scale field test through an installation on a major turnpike where fog conditions periodically exist."

"This could be effected," he continued, "by stringing catenary cables between existing highway light poles and suspending from them a series of down-lights, some polarized, some unpolarized, for testing purposes."

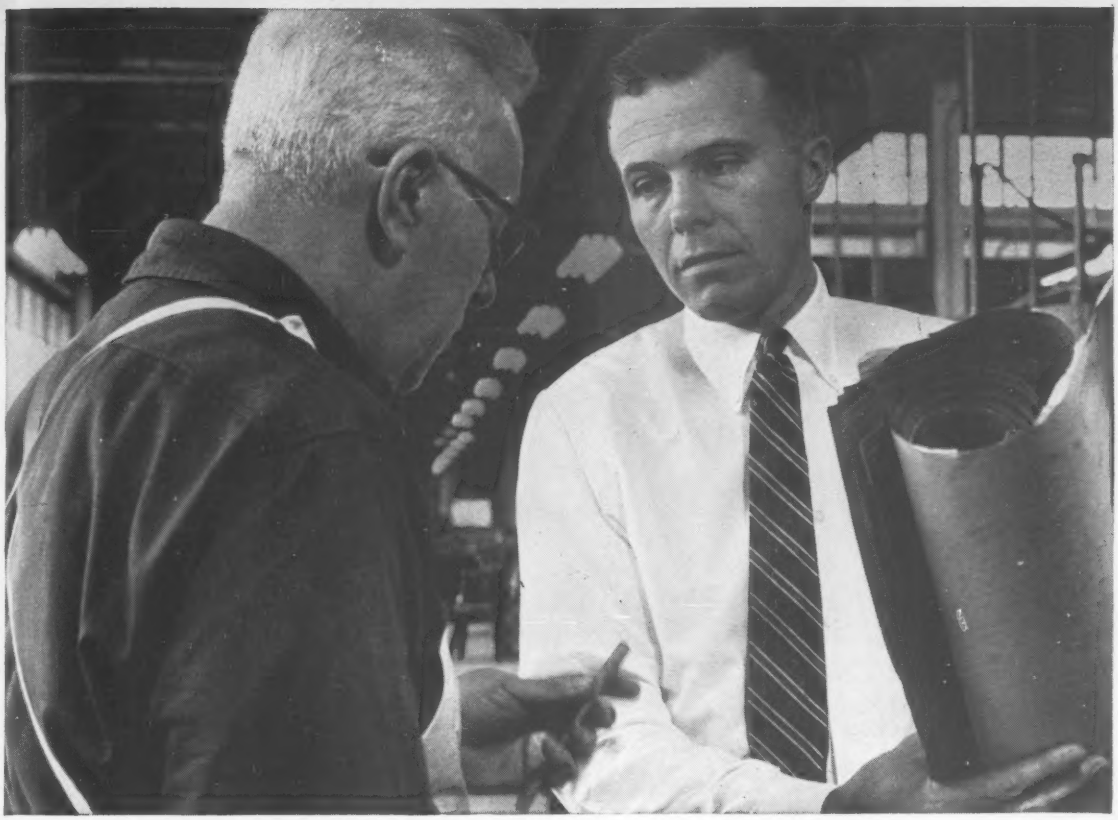
Because the down-lights would be reflector lamps with their beams directed vertically to the road surface, they would provide less spread road illumination than the conventionally mounted overhead lamps. Therefore a greater number would have to be installed to supply adequate coverage of lighting for any given area.

"This would serve as auxiliary lighting to be used only in periods of fog and, through the use of photoelectric cells, could be switched on automatically when fog of a predetermined density piled up." Conventional lighting could be switched off by the same photoelectric cell action.

• **Formula needed**—A test installation on a major turnpike would satisfy one of the next steps that research scientists feel are now indicated.

It is felt that a qualitative objective has been attained. It has been shown that light can be made to penetrate a fog barrier and achieve a dramatically-improved quality of vision. Professor Strong pointed out that now a quantitative objective must be attained. "We must learn how to anticipate accurately the amount of visibility in any given fog situation and perhaps establish a formula for use by highway officials to guide them in designing the lighting and, in extreme cases, determining when to restrict road operations and when to suspend operations entirely."

Penetration of fog with light might



Don't let your blueprints take the blame

TOO OFTEN costly production errors are blamed on hard-to-read blueprints. The real culprits, of course, are the old smudged drawings from which the prints were made.

However, a simple step makes such drawings capable of producing sharp, legible prints—*reproduce them on Kodagraph Autopositive Paper.* This photographic material gives you positive intermediates *directly* (no negative step)—sparkling intermediates even from soiled or weak-line originals.

Unlike your valuable drawings, they won't smudge or lose line density when used as "masters" in your print machine. They assure easy-to-read prints time after time—*pays you to make one of every drawing!*

But see for yourself—place an order for Autopositive Paper intermediates today with your print room or local blueprinter!

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New booklet is jam-packed with valuable tips on saving drafting time, protecting drawings, getting better prints.

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DRAFTING TRENDS

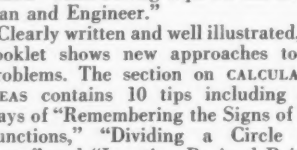
This free booklet, newly developed by the Frederick Post Company through the co-operation of leading engineers and draftsmen, shows 59 shortcuts to speed drafting and computation work.

Ideas for increasing drafting and engineering efficiency

POST went to leading engineers and draftsmen and asked them what techniques they use to save time without sacrificing precision in their work. From the many interesting tips and drafting shortcuts suggested, a total of 59 have been compiled into one handy booklet called "Time Saving Tips for the Draftsman and Engineer."

Clearly written and well illustrated, this booklet shows new approaches to old problems. The section on CALCULATING IDEAS contains 10 tips including easy ways of "Remembering the Signs of Trig Functions," "Dividing a Circle Into Parts," and "Locating Decimal Points."

One of 22 Drafting Shortcuts



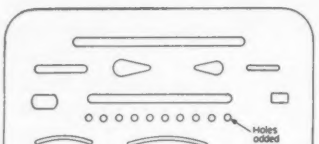
Here is what seems to be the fastest and easiest method of constructing an approximate ellipse: (1) Draw a line at 15° to major axis as shown. (2) Draw a line at 30° to minor axis as shown. (3) Draw a line at 60° to line #2 through intersection of lines #1 and #2. (4) Draw Arc R_1 from point P_1. (5) Draw Arc R_2 from point P_2.

9 tips in Engineering Data Section

Easy-to-use, practical shortcuts to formulas and other engineering data are featured in this section. Two of these time savers are faster methods of "Determining Gear Inertia" and "Interpolating Between Family of Curves."

One of 18 Board Timesavers

Fairly often when drafting it becomes necessary to change a solid line to a dotted line. By placing a series of holes in an erasing shield, as shown, it is possible to make the conversion simply by erasing through the holes.



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also have military value in preventing the nearly-complete stoppage of patrol activity such as usually occurs under dense fog conditions. Adaptations are also possible for the benefit of military and civil aviation.

Two "firsts", in addition to the first satisfactory penetration of fog by light, were established in the course of the tests, it was reported. The initial innovations occurred when the degree to which various densities of fog scatter auto headlamp and roadway illumination was measured. More than 100 years of previous research had failed to produce dependable measurements of this phenomenon.

• **Fog sniffer**—Equipped with a specially constructed "fog-sniffer" attached to a laboratory station wagon—and detachable for observations at road level—the Michigan scientists shot narrow beams of light at various types of roadway fog. Then, with a photoelectric cell, they measured the resultant scatter from various angles, their findings being automatically recorded on tape.

Artificial "fog" previously was created by laying down a blanket of smoke, the density being controlled by spigots attached to the conveying ducts. Although the density ordinarily was satisfactory, Dr. Blackwell's studies showed that the physical structure was radically different from natural fog and that it was not sufficiently representative for lighting tests. Professor Marsh thereupon developed artificial fog with the qualities of natural fog by forcing water through a fine nozzle under 70 lb of air and 10 lb of water pressure.

The density of this man-made fog can be controlled through the use of a photoelectric cell adjusted to react and cut off the pressures when the fog reaches a pre-selected level.

Clay Pipe Manufacturers To Build Research Lab

The National Clay Pipe Manufacturers Association is about to build a new research building and laboratory facilities to house the industry's expanded research program. Its present laboratory is located in Los Angeles. The new one will be erected in Crystal Lake, Ill.

The building, designed by architects George F. Keck and William Keck of Chicago, will incorporate maximum use of clay products in both exterior and interior. Skydomes will be used for greatest utilization of natural light. The office area will be covered by a mezzanine floor that will house small unit laboratories. Completion is expected by this fall.

Forms are tied in a central location. Two men tie an 8-foot column form in an average of 5 minutes using Signode steel strapping and 2-piece tool set.

Strapped form is lowered to the floor below over reinforcing rods. Strap placement per Signode formula.

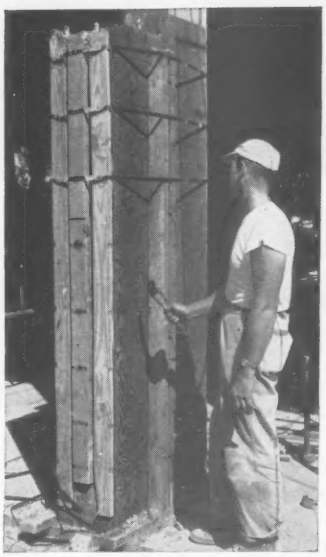
Contractor ties concrete column forms in 5 minutes with Signode steel strapping

Seth E. Giem & Associates, Memphis, Tenn., is an old hand at using Signode steel strapping for tying forms for concrete columns. These pictures were taken during construction of the Bronson Hospital Nurses' Home, Kalamazoo, Mich.

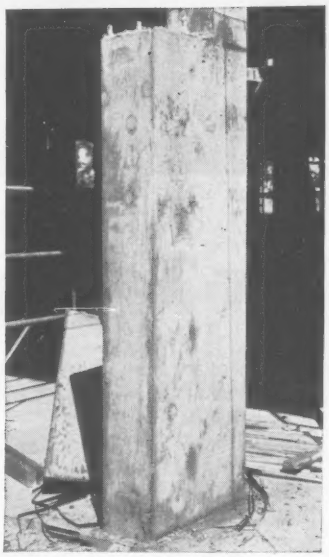
On this job, the forms for each floor are built in a central location. Then the strapping is put on—in five minutes per form by two men, in less than ten minutes by one man. The forms are next lowered into position, the collars put on, the column trued up, and the pouring can begin.

When the concrete is set, each strap is simply snipped, and forms are quickly removed. There are no clamps or yokes to handle or care for. You will find many other uses for steel strapping on a construction job, such as bundling of materials and reinforcing scaffolding.

Signode has developed form designs and strap spacing formulas for a variety of column sizes—can save you a lot of time in getting started right in the time-saving application of steel strapping to your forms. Call the Signode man near you, or write:



Strapping is stripped in moments with Signode cutters. No form clamps to move.



A complete basement form. Note smooth finish, squareness, flatness. There's no bulge.

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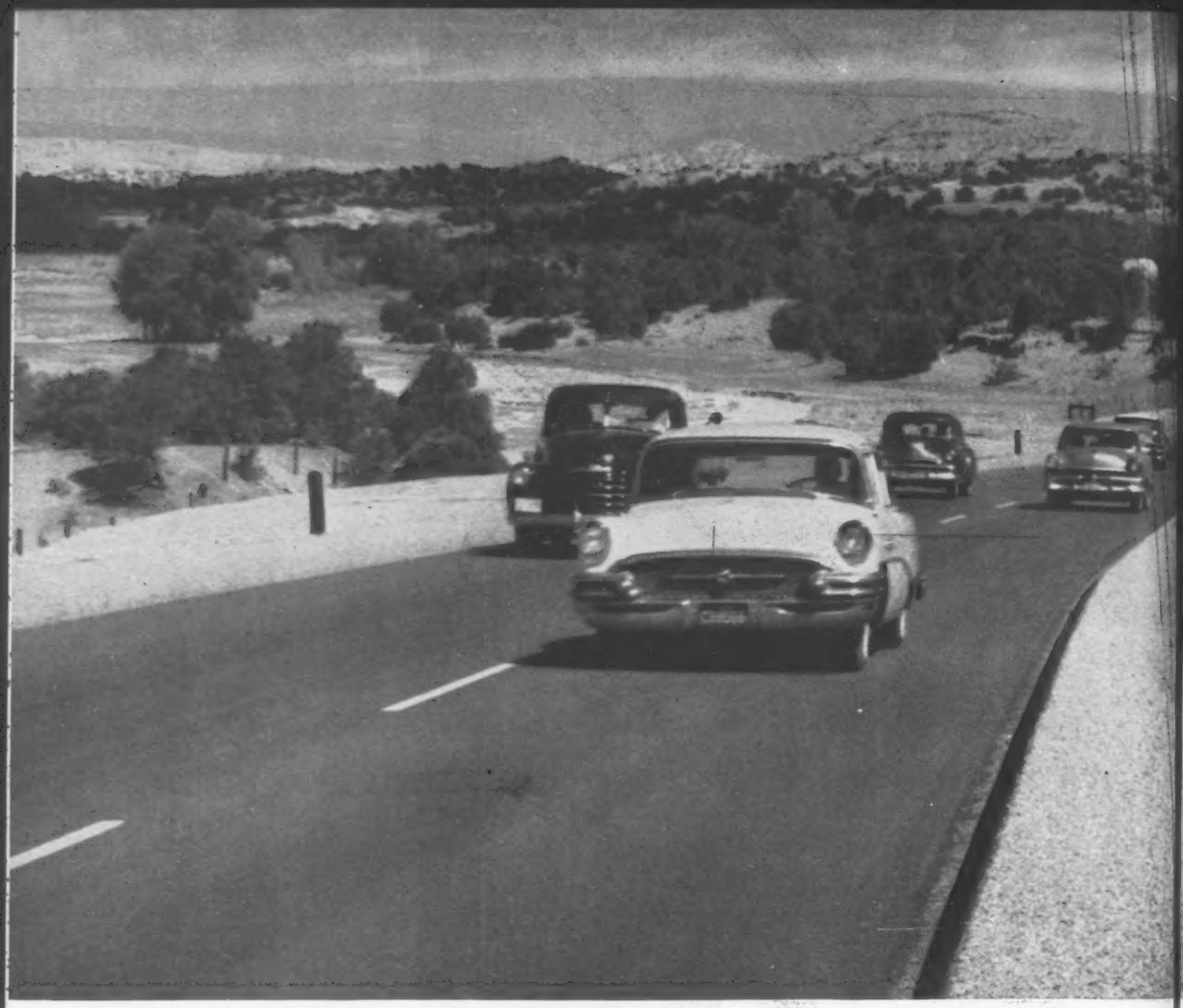

New Tesuque By-Pass ASPHALT -pa

New Mexico's Chief Highway Engineer says ASPHALT pavi

The new Tesuque By-Pass extending from the northern limits of Santa Fe to a reunion with the old Taos Road beyond Tesuque is a modern Asphalt highway. The lanes, shoulders, curbs . . . and even the six-foot median strip . . . are Asphalt-paved. And there are plenty of good reasons *why*.

"Least Initial Outlay"

As Mr. L. D. Wilson, New Mexico's Chief Highway Engineer said after this project was completed: "The major portion of our highway construction will be heavy-duty Asphalt type . . . because it utilizes local materials and is most economical. By doing so, we can give the public the most miles for the least initial outlay."

One Free Mile in Every Ten*

With durable Asphalt construction you save up to 10% . . . and sometimes up to 50% . . . in paving costs alone.

This adds up to *one free mile in every ten* with modern Asphalt paving. Sometimes even more.*

Also, scientifically engineered Asphalt pavement costs no more to maintain. Often *less*. And maintenance is quick and easy, too.

OTH

You give
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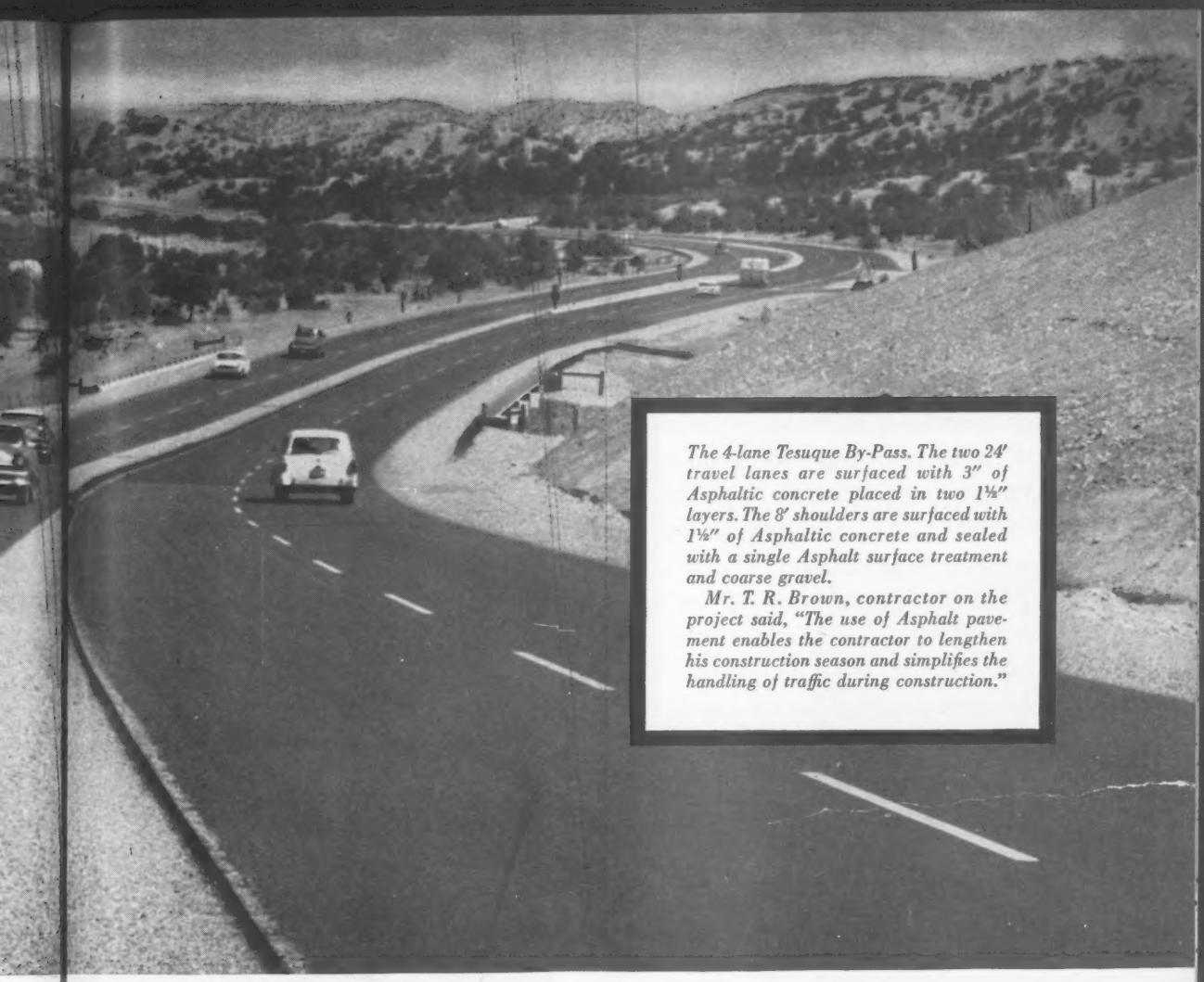
*Examples on



The 4-lane Tesuque By-Pass. The two 24' travel lanes are surfaced with 3" of Asphaltic concrete placed in two 1½" layers. The 8' shoulders are surfaced with 1½" of Asphaltic concrete and sealed with a single Asphalt surface treatment and coarse gravel.

Mr. T. R. Brown, contractor on the project said, "The use of Asphalt pavement enables the contractor to lengthen his construction season and simplifies the handling of traffic during construction."

LT -paved from shoulder to shoulder

LT paving is "most economical"

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You give taxpayers *more* economy with modern Asphalt pavement. You give them more, better and wider highways. Smoother-riding, rugged pavement with plenty of built-in skid resistance.

Glare-absorbent pavement that is more comfortable on the eyes. Lane markings that are easier to see day and night . . . for greater safety.

Keep the costs of your new roads within the taxpayers' ability to pay, with modern Asphalt pavement.

**Examples on request*

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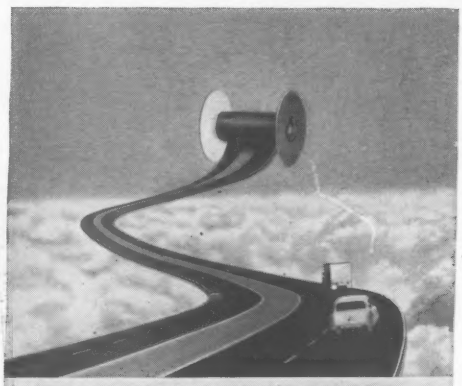
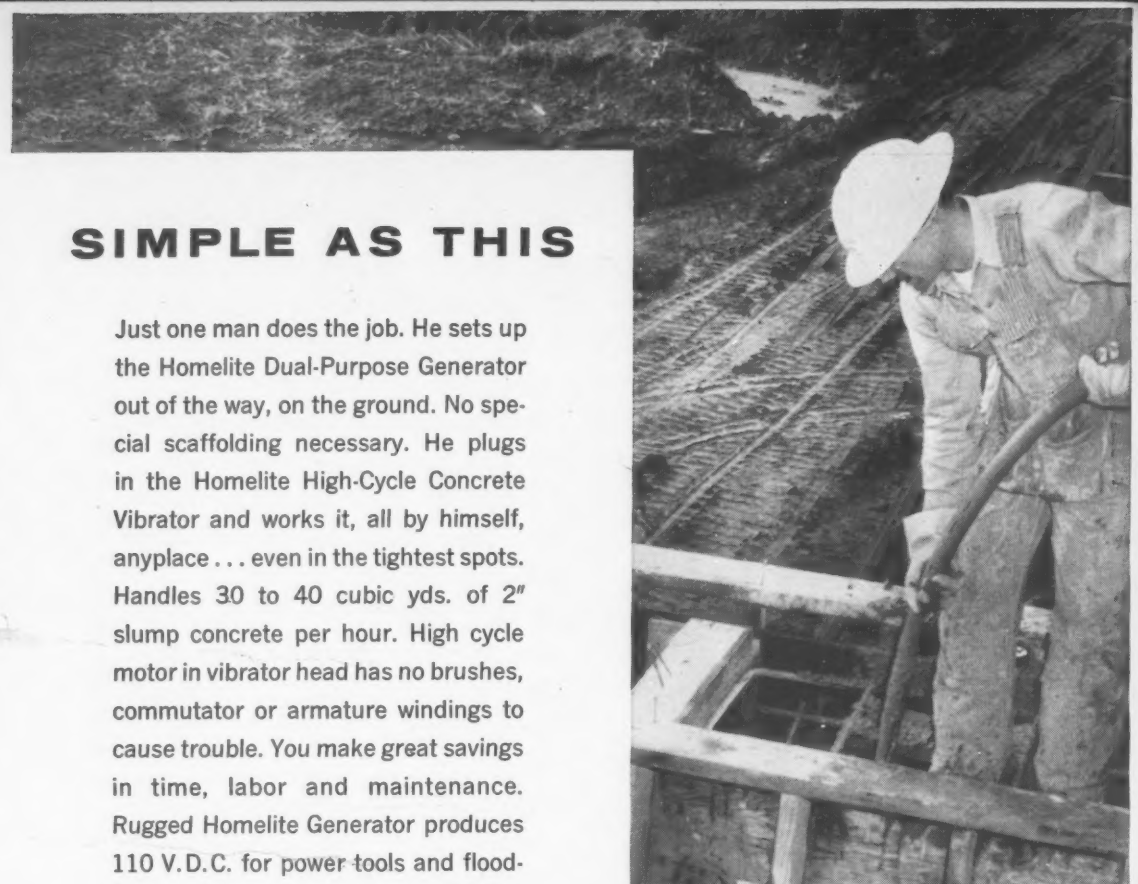
Asphalt Institute Building,
College Park, Maryland



Ribbons of velvet smoothness . . .
MODERN **ASPHALT** HIGHWAYS



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Books

Brittle Behavior of Steel

CONTROL OF STEEL CONSTRUCTION TO AVOID BRITTLE FAILURE—Edited by M. E. Shank. 184 pp. American Welding Society, 33 W. 39th St., New York 18, N. Y. $4.50.

BRITTLE BEHAVIOR OF ENGINEERING STRUCTURES—by Earl R. Parker. 323 pp. John Wiley & Sons, Inc., New York, N. Y. $6.

It seems an amazing coincidence that two books so similar in scope and subject matter should be published simultaneously. For both have as prime objective presentation of a summary of current knowledge of the brittle behavior of steel in structures. Apparently based on the same source material, they differ very little in approach to the subject and in conclusions.

The book edited by Professor Shank, of Massachusetts Institute of Technology, represents the combined efforts of all members of the Plasticity Committee of the Welding Research Council. It is divided into three parts. Part I. Materials offers the basic concepts and mechanisms of notch brittleness and discusses the factors that affect adversely the local plastic behavior of metals. Part II. Fabrication describes how notch brittleness may be brought about during fabrication operations. And Part III. Design offers suggestions to aid the designer in selecting the proper steel and fabricating procedures to avoid brittle behavior.

The book written by Mr. Parker, chairman of the Division of Mineral Technology, University of California, was prepared for the Committee on Ship Steel, National Academy of Sciences-National Research Council. Like the other treatise, it covers basic concepts of notch brittleness in the early portions. Then, it discusses the influence of chemical composition and manufacturing practices. After that, it describes the effects of design and workmanship.

The Parker book is somewhat more detailed in its treatment of the various topics than the WRC text, which is aimed principally at structural designers.

Brittle failures may occur in structures under very low loads, both books point out. Nominal tensile ultimate strength or yield point are not governing factors in such cases. These properties, based on simple uniaxial tests at room temperature, do not shed much light on the properties of structural steel under conditions of restraint and adverse temperature and in the presence of a notch or crack.

When temperature drops, a point is reached (nil ductility transition temperature) where the ability of steel to absorb energy is practically negligible. Below this critical temperature failures are brittle; just above it, steel may fail in a cleavage manner, but the fracture will not be so completely brittle. At higher temperatures, the steel will behave in a plastic manner; the fracture will be of the shear type.

The nil ductility transition temperature is not a constant for any particular steel. It depends on many factors—including the presence of notches or cracks—and these factors are dealt with at length in both books.

To avoid brittle failure, several courses are open to the designer: 1. Use low stresses; 2. Avoid notch effects and high local stress concentrations; 3. Select a material with high notch toughness; 4. Insist on sound workmanship and suitable inspection and supervision; 5. Choose the proper fabrication process. Both books discuss these techniques in detail.

Books & Pamphlets

• **Sanitary landfill films**—Refuse disposal by sanitary landfills is the subject of two films numbered F-229b and M-228. The first, a 35mm filmstrip in color and sound, has 41 frames and shows how the sanitary landfill can be adapted to small towns and communities. Lightweight equipment is featured in the several alternative practices presented. The second, a 16 mm motion picture in color and sound, runs 13 minutes and presents features and methods of the sanitary landfill system. For a short-term free loan of other film, write Public Health Service, Communicable Disease Center, 50 Seventh St., N. W., Atlanta, Ga.

• **ARBA Directory**—The 1957 edition of the directory of "Highway Officials and Engineers," published by the American Road Builders' Association, is now available for distribution. The directory is available from ARBA, 600 World Center Building, Washington 6, D. C.

• **Septic tank design**—USPHS has put out an 85 page "Manual of Septic Tank Practice" for use as a guide by health agencies, building officials and builders. It presents septic tank design from a practitioners' viewpoint, covering installations for private homes, institutions, recreational areas and other similar establishments. The book is available from the Government Printing Office, Washington 25, D. C., for 35 cents.

Complete Line of Homelite Carryable Construction Equipment Now Available

Self-Priming Centrifugal Pumps . . . Carry these lightweight, dependable pumps anywhere. Non-clogging design . . . 28 foot suction lift . . . capacities up to 15,000 g.p.h. . . . sizes from 1½" to 3". Diaphragm pump also available.

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New Products

Device Converts Motor Grader Into Compactor

The new Graderoll, recently brought out by Midland Manufacturing Co., is a rubber-tired compaction unit installed on any tandem drive motor grader to convert the rig into a combination road maintenance and pneumatic-compactor machine.

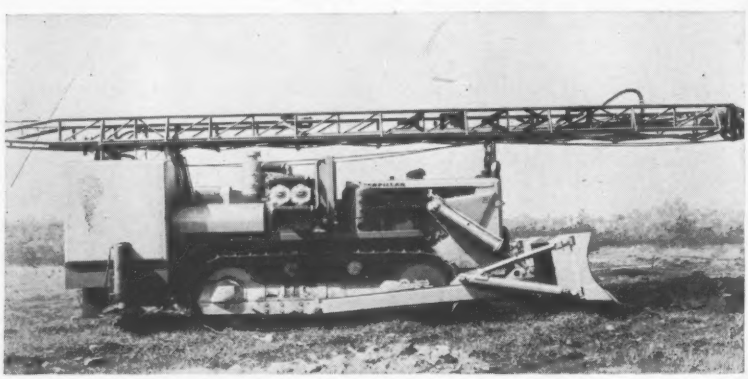
The company claims effective compaction weight on each of the six tires, when installed on a 23,000 lb motor grader, is 1,536 lb. Thus the unit delivers effective compaction in one operation following the grader blade material distribution. MIDLAND MANUFACTURING CO., HUNTINGTON NATIONAL BANK BUILDING, COLUMBUS, OHIO.

Special Mold, Wood Panels Will Make a Culvert Form

A special steel mold that connects with standard wood panels has been designed to form a culvert that can be concreted monolithically. The mold is a 9 x 9 in. steel section that provides a 3 in. face on the roof slab and on the wall. It forms a 45 deg fillet 8½ in. wide between wall and roof. The mold comes in lengths of 4, 6 and 8 ft and can be used with both metal-frame and wood-frame forms. Special size forms are available on order.

The form can be re-used many times and is claimed to eliminate the costly building up of special forms between the wall and roof panels.

Culvert forms are secured with standard form hardware. No special fittings are required. SYMONS CLAMP & MFG. CO., 4249 W. DIVERSEY AVE., CHICAGO 39, ILL.



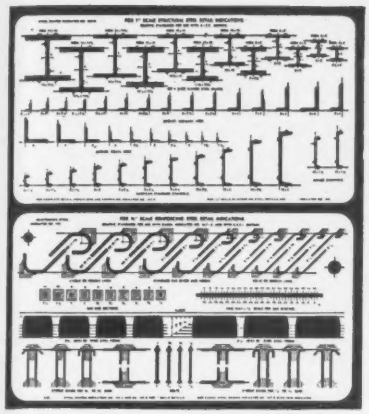
Tractor Mounted Rotary for Heavy Jobs

A tractor-mounted rotary air drill, designed for extra heavy jobs under the most severe working conditions, is available from Davey Compressor Co.

The drill has a rated capacity of 10 in. blast holes and 35,000 lb. pull down pressure.

The new model, designated M-8TA, uses compressed air for cleaning drilled holes and is said to be the only rotary drill completely successful as an air core drill. Manufacturer's tests show that the machine attains rotating speeds of 85-155-325 rpm normal drill bit speeds, with 3-speed transmission. Air pressures of 10 to 125 psi are available.

Originally designed for mounting on either new or used Caterpillar D8 tractors, the drill can be adapted to other machines of similar size, the manufacturer says. DAVEY COMPRESSOR CO., KENT, OHIO.



Templet Kit Covers Many Steel Detailing Profiles

A comprehensive kit of five vinyl templetes gives a wide range of detailing profiles for fabricators and users of structural and reinforcing steel.

Four of the templets cover steel beam, column and pipe shapes, channels, joists, angles, removable concrete forms, rivet spacing scales and angle legs in $\frac{1}{8}$ in., $\frac{1}{4}$, $\frac{1}{2}$ and 1 in. scales. The fifth templet specializes in reinforced steel details and includes bar bends and hooks, bar size sections, concrete sections, etc. The templets are $5\frac{3}{8}$ and $9\frac{7}{8}$ in. in plan.

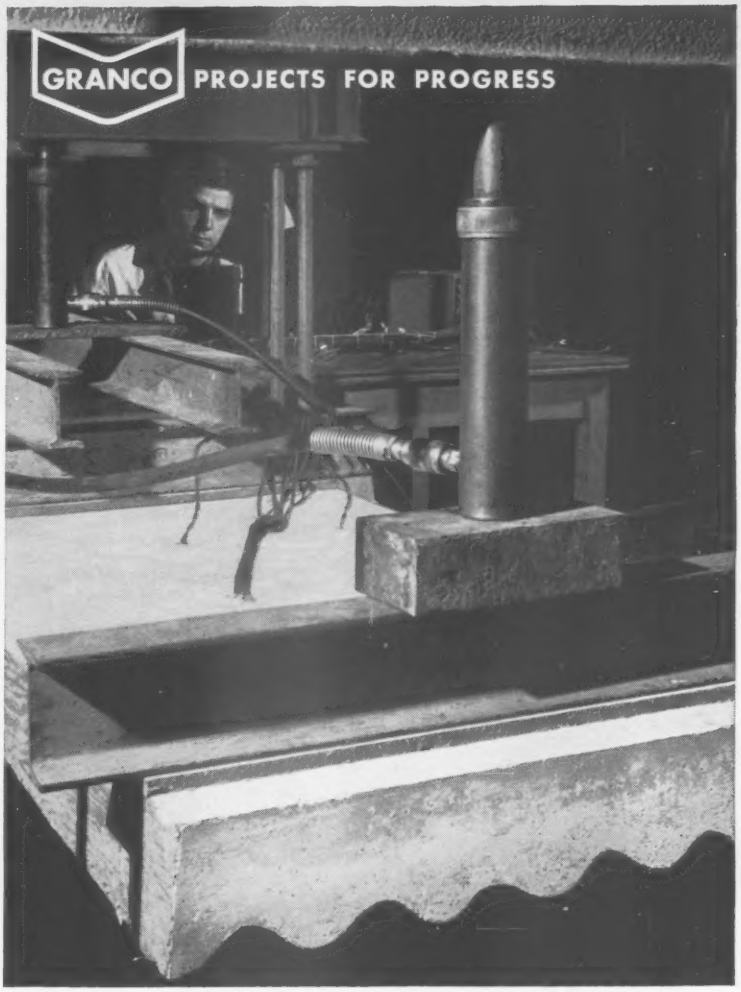
A complete kit of five templets, imprinted with all pertinent data, costs $17.50. Separate templets cost $3.75 each. A. Lawrence Karp, P.O. Box 242, Greenwich, Conn.

New Heavy Duty Crane Added to Lorain Line

A new 25 ton self-propelled crane known as Model SP-425 has been added to the Lorain Line of power shovels and cranes. The model is designed for a one-man operation, with controls for carrier and turntable located at the operator's position in the cab.

According to the manufacturer, new features offered as standard equipment are the "Shear-Ball" mounting eliminating turntable rollers, center pins and centering gudgeons; and a 30 ft pin-connected crane boom of alloy steel.

The carrier, designed for heavy duty service, utilizes a heavy duty, spring-mounted dead front axle of tubular design and provides for non-scuff, dual front wheels of the differential type. The rig has four travel speeds in both directions. Thew-Shovel Co., Lorain, Ohio.



"CARDIOGRAPH" FOR A CONCRETE SLAB

Sensitive stress-measuring device proves the strength of a Cofar floor system, . . . helps speed better products to you.

Operating like a cardiograph that records the strength of a human heart, the 50 strain gages buried in the concrete slab, above, measure the amount, location and direction of stresses that result when loads are applied to the slab. This precision device is one of many experimental rigs used by the research laboratory at Granco Steel Products Company. This laboratory develops better Granco products for the construction industry and provides data that enables architects and engineers to use these products with *predictable* results. Here, we're testing the strength of a Cofar reinforced-concrete floor system in which form and reinforcement are combined in one operation.

Like to see the results of this test? We'll be happy to send them to you, absolutely free, if you'll drop us a card today. This is the story of Granco product research . . . the right road to progress.

GRANCO® STEEL PRODUCTS COMPANY
6506 N. Broadway, St. Louis 15, Missouri
A Subsidiary of **GRANITE CITY STEEL CO.**
Distributors in 80 Principal Cities

GRANCO — SINCE 1878 GRANITE CITY STEEL

★ ★ ★ ★ ★

FIRST

STEEL MESH DECK

Still Making History!

The first installation of an open steel grid flooring on any bridge in the world was made in 1932, on the University Bridge, Seattle, Washington, by the Irving Subway Grating Co. The previous solid pavement on the bridge had been plagued by frequent repairs and accidents.

After 24 years this decking is still in service on the Seattle Bridge. It has had no major repairs and has never even been painted. Not a single accident has occured due to the bridge flooring.

Since then, 80% open Irving Decking has been used advantageously on hundreds of other bridges.

This remarkable record of service speaks for itself.

★

Write for complete information on Irving Bridge Decking.

ECONOMICAL

SAFE

DURABLE

"A Fitting Grating for Every Purpose"

IRVICO

IRVING SUBWAY GRATING CO., Inc.

Originators of the Grating Industry

Offices and Plants at
5063 27th St., LONG ISLAND CITY 1, N. Y.
1863 10th St., OAKLAND 23, CALIFORNIA

Publications

Hardware—A study of Caterpillar track bolts and nuts is told in a new 8 page booklet "Hardwear Hardware". The booklet discusses in detail the requirements track bolts and nuts must meet in order to give top performance, and shows how machine owners can make their own test to determine which hardware is best. CATERPILLAR TRACTOR CO., PEORIA, ILL.

Crawler Tractor—A cut-away view of the Allis-Chalmers HD-21 diesel power torque converter tractor is the feature of a new 4 page specification sheet (MS-1191) now available. Marginal notes point to many of the machine's mechanical design and construction features. CONSTRUCTION MACHINERY DIV., ALLIS CHALMERS MANUFACTURING CO., MILWAUKEE, WIS.

Masonry Saws—Two new brochures are now available covering the complete line of masonry saws manufactured by this company, showing the outstanding features of the new 2 hp Supermatic and the 1½ hp original Select-A-Notch Masonry saws. CLIPPER MANUFACTURING CO., SUITE 156, 2800 WARWICK, KANSAS CITY 8, MO.

Tracto-Loader—A 16 page catalogue describes the Tracto-Loader line of front end wheel loaders, illustrating and describing each of the five models currently in production. TRACTOMOTIVE CORP., DEERFIELD, ILL.

Fork Trucks—An 8 page catalogue describes construction, operating characteristics and specifications of the new Ranger line of fork trucks for outdoor handling. All three models in the line —of 15,000, 20,000 and 30,000 lb capacity—are treated in the catalogue. INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT CO., BATTLE CREEK, MICH.

Paving Equipment—A loose-leaf type brochure, containing separate inserts of informational material, is available from Cleveland Formgrader Co. The brochure covers the company's complete line of paving equipment. THE CLEVELAND FORMGRADER CO., MILLS ROAD, AVON, OHIO.

Building hardware—Specifications, dimensions, finishes and styling of Welch Brothers line of locks, latches and builders hardware are contained in a new catalog. Also included is the Welch line on gate locks and latches. WELCH BROTHERS LOCK CO., P.O. BOX 77, NORTH CHICAGO, ILL.

Scraper—Latest developments on the Model 55 Payscraper are described in an 8-page booklet. Close-up photos of important features such as the improved bowl, three-piece reversible cutting blades, and flow system of power steering show why the unit is easily operated, has maximum safety and durability. A page is devoted to specifications of the various components. CONSTRUCTION EQUIPMENT DIV., INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.

Roof decking—Various methods of using Insulpanel for roof decking in residential and industrial construction is described in an 8 page brochure. (Insulpanel consists of asphalt-impregnated pressed wood sandwiched between asbestos-cement sheets.) Wood and steel framing, fastening details and specifications of Insulpanel also are included. KEASBEY & MATTISON CO., AMBLER, PA.

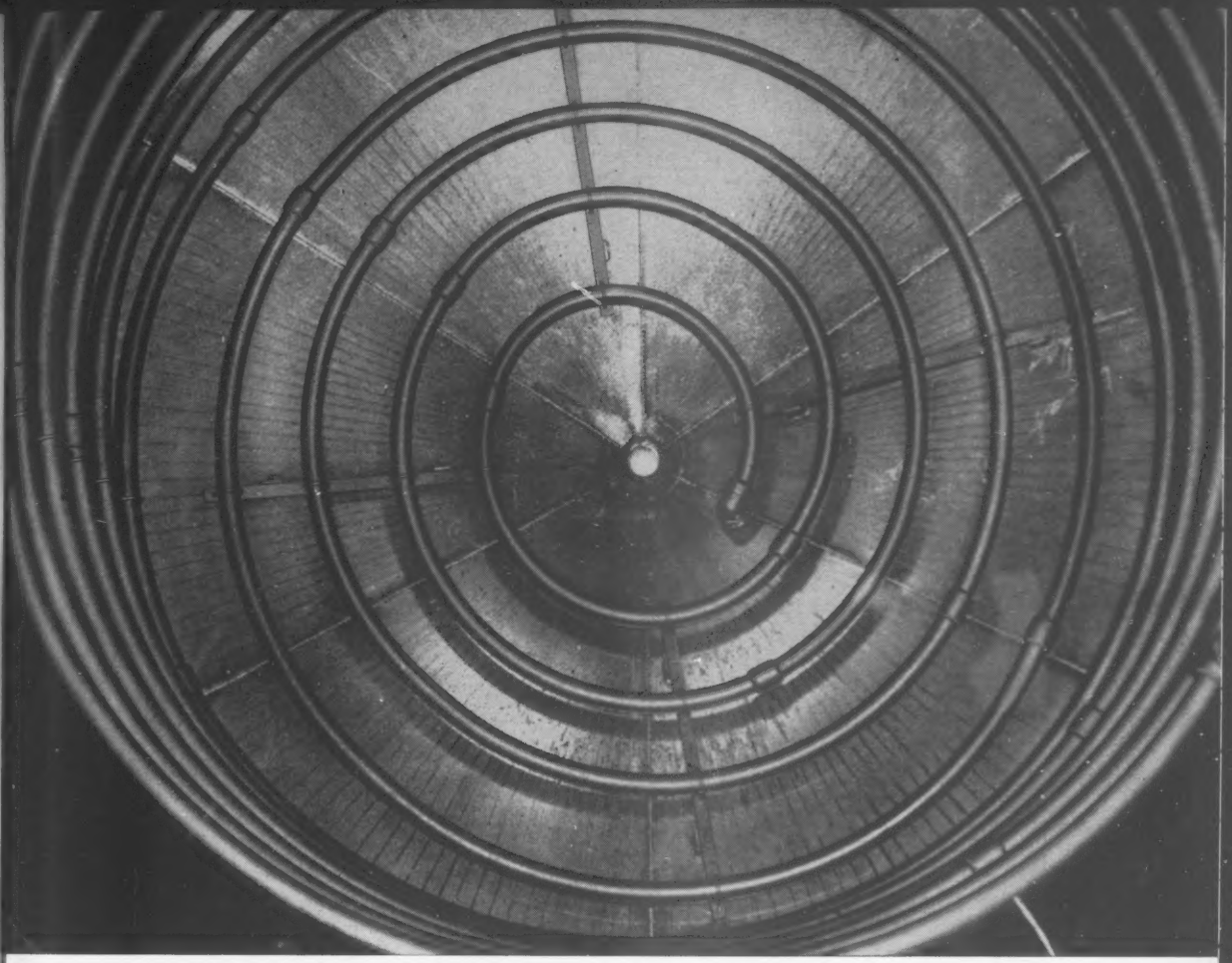
Sealing compounds—The advantages, typical uses and methods of application of DEL synthetic rubber sealing compounds are given in an 8 page booklet that also contains drawings of typical windows and joint sealing methods. DAVID E. LONG CORP., 220 E. 42 ST., NEW YORK 17, N. Y.

"Highway Lighting"—The American Road Builders Association has just published a technical bulletin presenting such aspects of highway lighting as design criteria, elements required and adaptation lighting, plus a table of statistics on decreased fatalities in 28 areas where hazardous lighting was corrected. STREET AND HIGHWAY SAFETY LIGHTING BUREAU, 1400 TERMINAL TOWER, CLEVELAND 13, OHIO.

Pipe joint seal—A 4 page brochure illustrates and describes applications for clay pipe joint sealant. SUPERIOR CLAY CORP., UHRICHSVILLE, OHIO.

Residential conditioning—A booklet "Heating and Air Conditioning with Water for Year 'Round Comfortable Living," will help builders and architects explain heating and air conditioning systems to prospective home buyers. Information is given in simple language with explanatory illustrations in color. The booklet is intended to give the client a clear idea of what he can expect from his investment in terms of heating and air conditioning. NATIONAL U. S. RADIATOR CORP., 944 ASH ST., JOHNSTOWN, PA.

(*Publications cont'd* on p. 72)



This processing tank employs wrought iron pipe for heating coils. Excellent bending properties, as well as corrosion resistance, lead to wrought iron's selection for this installation.

Wrought Iron Pipe's ductility permits speedy bending and stretching without rupturing the metal

Readily bent and formed, hot or cold, wrought iron pipe's high-purity base and fibrous structure assure little or no "springback."

Evidence of wrought iron pipe's excellent bending properties is the extensive use of the material for heating coils, refrigeration coils and air brake piping where short radius bends are necessary. You can tack on the corrosion and fatigue resisting properties of the material, too, for its acceptance in these applications. Our technical bulletin, *The Bending and Flanging of Wrought Iron Pipe*, shows how to produce uniformly superior results. Write for a copy. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

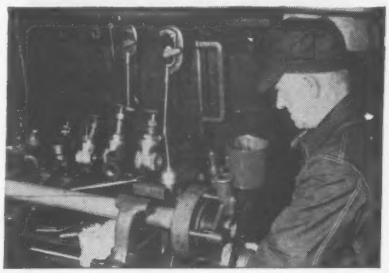
Available in Canada and throughout the world

◀ EASY TO WELD

Wrought iron produces sound welds by any of the commonly used processes because it is self-fluxing. Complete line of wrought iron welding fittings for pipe is available in sizes ¼" to 12".

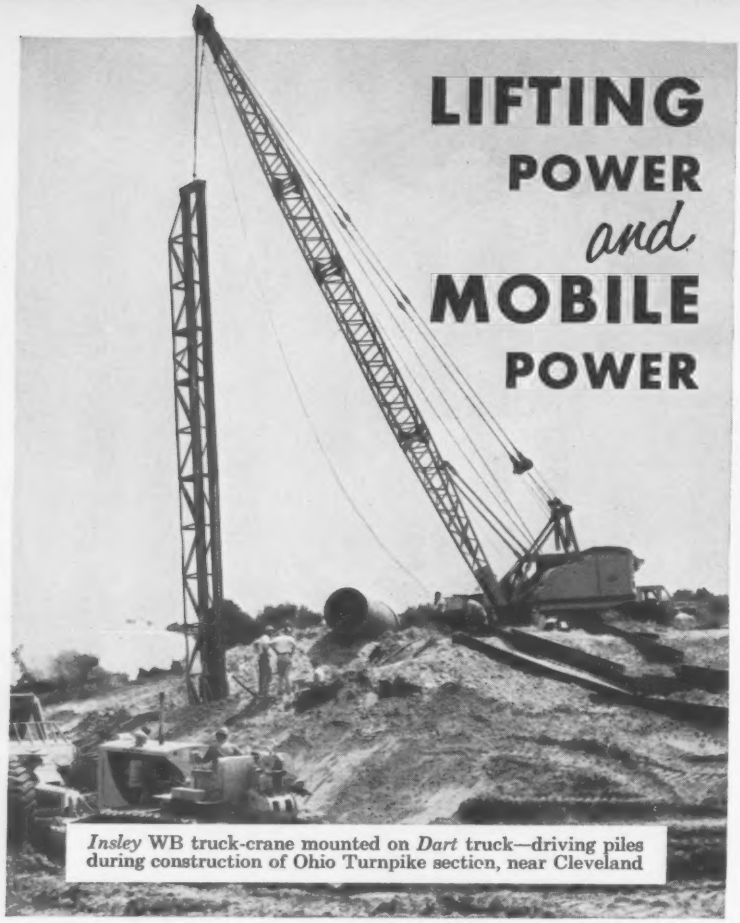
EASY TO THREAD ▶

The machining and threading properties of wrought iron pipe are excellent. The uniform structure of the metal contributes to smooth, sharp threads.



BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS



Insley WB truck-crane mounted on *Dart* truck—driving piles during construction of Ohio Turnpike section, near Cleveland

BOTH Crane and Truck have

WAUKESHA ENGINES

POWERING CRANE (Boom)

Waukesha 140-GK Gasoline—6-cyl., 4½ x 5½-in., 525 cu. in., 160 hp @ 2250 rpm. Send for descriptive bulletin 1548.

POWERING TRUCK (Carrier)

Waukesha 145-GK Gasoline—6-cyl., 5¼ x 6-in., 779 cu. in., 216 hp @ 2000 rpm. Send for descriptive bulletin 1551.

348

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK TULSA LOS ANGELES

. . . Publications

Cooling towers—A new line of Flow-Cold cooling towers in capacities of 3 to 20 tons is described in a 4 page illustrated catalog from Acme Industries, Inc. The folder outlines the company's new plastic cooling pak and offers complete selection data to make the proper choice of six different models to match capacity requirements. Also included are dimensional drawings giving overall unit sizes for all models plus locations of all water connections. CATALOG NO. 371, ACME INDUSTRIES, INC., JACKSON, MICH.

Full Line Catalog—State Equipment Co. has introduced a distributor design catalogue for the heavy equipment owners and buyers, featuring scores of full-action photographs and descriptions of more than 35 lines of equipment available at the company's eight branch offices in the northeast. STATE EQUIPMENT CO., 3725 NORTH FRONT ST., HARRISBURG, PA.

Power Cranes—A 24 page catalogue featuring the company's 75B series of ¾ yd power excavators is now available, containing detailed action photographs of power shovels, cranes, draglines and other optional excavator attachments. CUSTOMER SERVICE DEPARTMENT, GAR WOOD INDUSTRIES, WAYNE, MICH.

Bituminous Application—A new bituminous application guide (shot guide) is designed to be a quick reference in determining the correct speed of a bituminous distributor when applying a predetermined amount of material to a road surface. LITTLEFORD BROS., INC., 457 E. PEARL ST., CINCINNATI 2, OHIO.

Watertight masonry—A 6 page folder on the subject of design and specifications of watertight masonry describes six considerations in designing tight masonry walls. The bulletin also outlines the use of Omicron Mortarproofing in providing a cohesive mortar. WILLIAM T. KENNEDY, THE MASTER BUILDERS CO., 7016 EUCLID AVE., CLEVELAND 3, OHIO.

Trenchers—The Challenge Universal Trencher is illustrated and described in detail. It is a ladder type machine that will dig trenches to 5 ft 3 in. deep and from 12 to 18 in. wide with square or round bottoms. The ladder, bucket line, and reversible conveyor are hydraulically operated. A backfill blade for clearing ahead of the machine, leveling high spots, and refilling trenches is standard equipment. COOK BROS. EQUIPMENT CO., 3334 SAN FERNANDO ROAD, LOS ANGELES 65, CALIF.

Long lengths of BETH-CU-LOY speed up installation

One of the beauties of using light-weight drainage pipe made of Beth-Cu-Loy sheets is the long lengths that can be used. By way of example, a 14-ft section of 18-in. diameter pipe made of 16-ga Beth-Cu-Loy weighs but 214 lb, which means that it can be unloaded and placed in the trench without the use of mechanical hoisting equipment. As a matter of fact two men should be able to do the job.

From this it can easily be seen that still larger diameters in still heavier gages can be handled with only the simplest of lifting machinery. And, of course, the long lengths of the sections reduce the number of field joints, and enable the pipe-laying crew to keep right up with the trench diggers. Beth-Cu-Loy field joints are, themselves, a simple and time-saving operation which affords additional economies.

Light though it is, pipe made of Beth-Cu-Loy has the great strength of steel, and the corrosion-resistance of zinc. It is flexible enough to "give" with the fill and help distribute the load around its own periphery. It conforms well to grade and alignment and absorbs impact, vibration and the shifting effect of weather changes.

Beth-Cu-Loy sheets meet the rigid specs of the American Association of State Highway Officials. If you would like further details about Beth-Cu-Loy sheets for drainage pipe, just get in touch with any Bethlehem sales office, or with one of the fabricators using our culvert sheet stock.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

78 cents per million gallons... pumped by Westinghouse

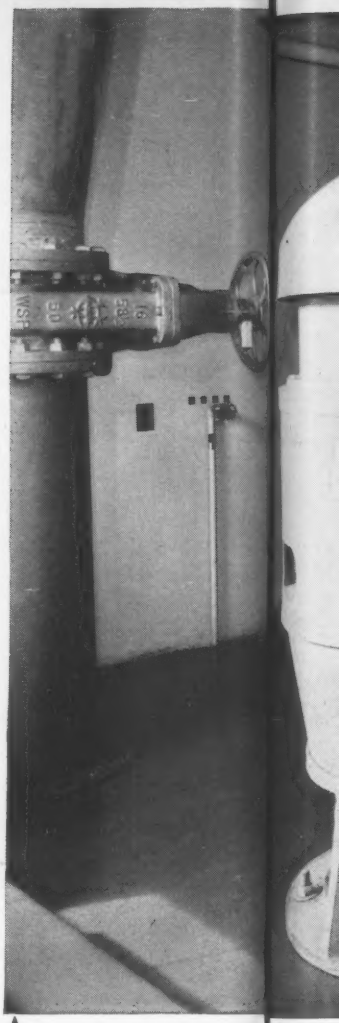
Basic operating cost of pumping stations in the Tacoma, Washington, sewage plant is of more than usual importance in the over-all plant cost because of an unusually high gallons-per-capita-day flow through the system. Engineers found it necessary to plan for nearly three times normal.

In the main pumping plant at Tacoma, four Westinghouse vertical pump motors handle the load. They are cut in and out as required and the sequence of rotation changed automatically. The station is unmanned except for periodic checks and maintenance by operators from the treatment plant.

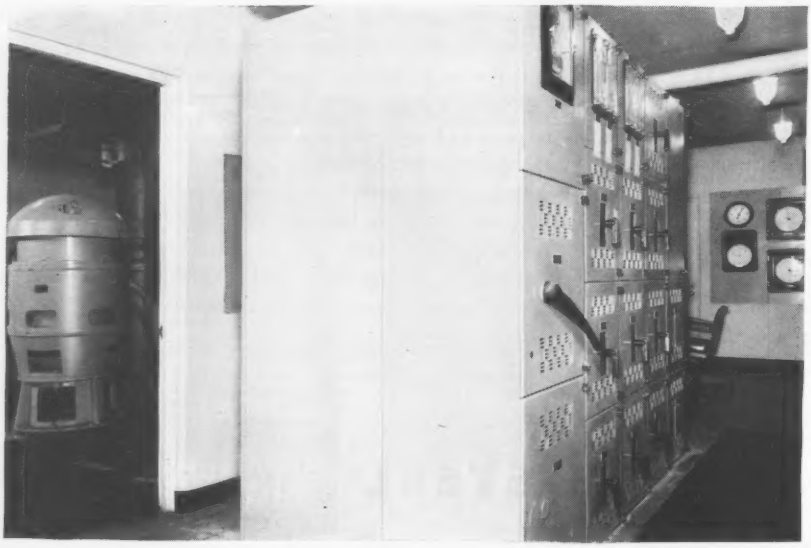
Although the pumping requirement is high in proportion to the population served (about 67,000) the actual pumping cost is not. Yearly costs in the Tacoma plant average about 78 cents per million gallons of sewage pumped. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. J-94075

YOU CAN BE SURE...IF IT'S

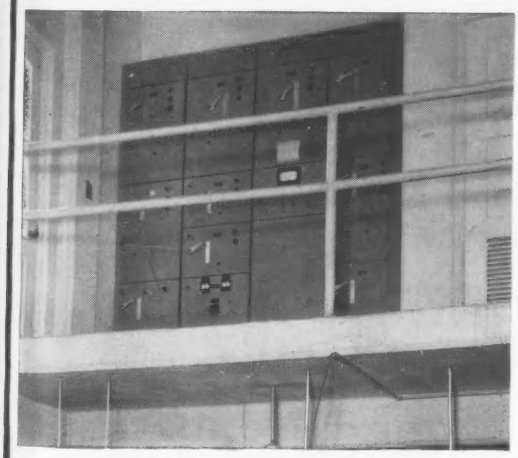
Westinghouse



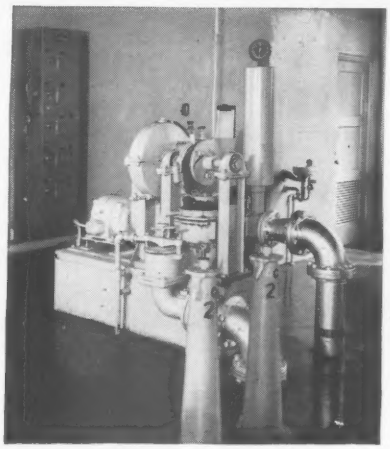
The four Westinghouse vertical pump motors in the Tacoma plant—4000 gpm, 50 hp; 8000 gpm, 100 hp; 10,000 gpm, 100 hp; 12,000 gpm, 125 hp.



Distribution of power to motor and lighting circuits for the entire plant is through this Westinghouse switchgear, located in the main pump building.



Control center for many of the sewage plant motors, located on a balcony to conserve space, is typical of the Westinghouse unitized equipment which simplifies sewage plant electrical construction.



This Westinghouse motor drives one of the many pumps in the treatment plant. Note convenient location of control unit for this and other adjacent motors.

We help you "catch" more new business

When you're looking for new construction business, Dodge Reports can help you "catch" just the jobs you want . . . because Dodge Reports cover the whole field of construction, tell you precisely what jobs are coming up and when. In addition, they tell you whom to contact and when bids are wanted (even who's bidding). If you'd like to see how you can get more and better business right in the area you serve, then read and mail this coupon today.

TO: **DODGE REPORTS**, DEPT. 106, 119 WEST 40th STREET, NEW YORK 18, N. Y.

Yes! I'd like to see how to get more business by knowing in advance who's going to build, what, when, where.

I want to know whom to contact and when to submit bids.

I'd like to see some Dodge Reports, and I'd like a copy of your booklet that tells how to use this accurate, daily, up-to-the-minute construction news service.

I understand that I can pick just the area in the 37 Eastern States and the type of construction activity that interests me. Also, that I won't have to wade through mounds of data to find the information I need.

I'm interested in General Building ☐ **House Construction** ☐ **Engineering (Heavy Construction)** ☐

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F.W. DODGE CORPORATION

Dodge Reports

For Timed Selling to the Construction Industry

Men and Jobs

Civil Engineering Chief Retires From Corps Labs

Lester E. Bozarth, chief of the civil engineering department at the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., has retired after 33 years of service with the Corps of Engineers.

A graduate of Virginia Polytechnic Institute, Mr. Bozarth joined the Corps in 1933 as junior engineer on the construction of Wilson Dam in Alabama. Among the many posts he has held is that of chief of the operations and construction division, Norfolk District, and chief of the construction division of the Air Force's $400 million Moroccan Air Base Complex.

Howard H. Mullins, assistant to Mr. Bozarth, has been named acting chief of the civil engineering department.

Careers

Government

John Keeley, 36, is named county engineer of Clackamas County, Ore. He has been with the Corps of Engineers.

Brig. Gen. Albert G. Viney is appointed a deputy chief of engineers in Washington, D. C.

Business

Marvin A. Larson has started his own structural engineering business in San Francisco. A licensed structural engineer in California, he has been associated with Hall, Pregnoff & Matheu, consulting engineers of San Francisco, and included in the buildings he has designed is the San Mateo County Courthouse. He has had both military and civilian experience with the Corps of Engineers and also has worked with Morrison-Knudsen in Alaska.

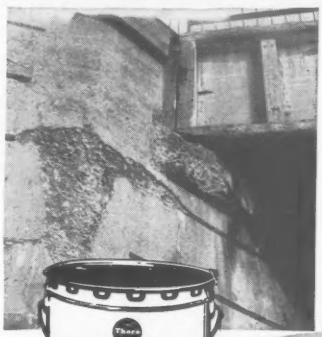
The office of **George E. Miller & Asociates** is opened in York, Pa., for the the practice of civil and sanitary engineering.

John A. Cataldo and Herbert W. Standke have been named assistants to Vice President and General Manager Frank Marcucella, for the John A. Volpe Construction Co. of Malden, Mass. Mr. Cataldo, a native of Boston, graduated from Tufts College School of Engineering in 1945 with a degree in civil engineering. Mr. Standke, a native of Germany, graduated in 1947 from Northeastern University. Other Volpe Co. changes include the promotion of **Philip A. Rossetti** to assistant to Chief Engineer Merrill B. Carter.

It's *New Again* with THORITE and THOROSEAL

Freeze-thaw cycle following water and moisture penetration, also swelling of reinforcing rods from moisture contact, cause masonry destruction.

BRIDGE OVER CONCORD RIVER
ROUTE 3, BELLERICA, MASS.



Workmen on scaffold patch spalled and cracked concrete with THORITE and seal surface with THOROSEAL.

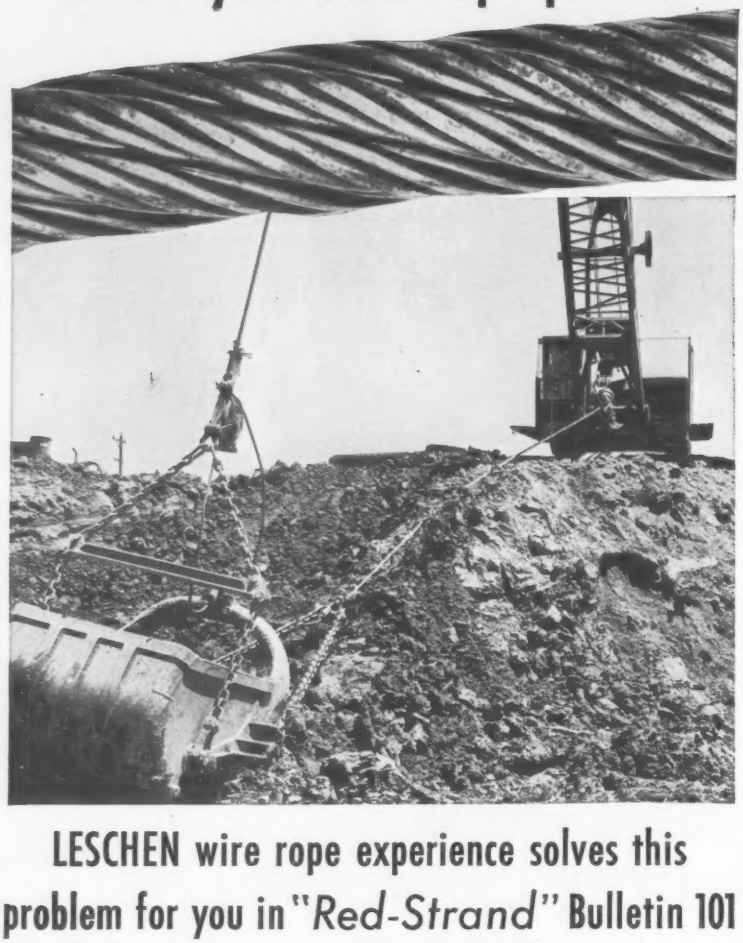
Area at left chipped to sound masonry. It will then be patched with THORITE *Nonshrink, Nonslump 20-Minute Set Patching Mortar,* without necessity of costly forming, finished by application of Thoroseal.

Request Circular No. 16 and 20.

Write for our 16 page "How to Do It"

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNSYLVANIA • CENTERVILLE, INDIANA

abrasion...
is this your wire rope problem?



LESCHEN wire rope experience solves this problem for you in "*Red-Strand*" Bulletin 101

SEND FOR YOUR COPY TODAY—You'll find this bulletin full of practical suggestions for minimizing the destructive effects of abrasion on wire rope you use. That means longer useful life, less down time, lower costs. These suggestions are in simple, non-technical language, easy to follow, yet technically sound...based on the same full century of rope making experience that insures consistent top quality in every foot of *Leschen Red-Strand Wire Rope*. So write for Bulletin 101 today. At the same time, ask for free engineering counsel on any other wire rope problem you may have experienced. Address: Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.

LESCHEN
Red-Strand

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

Obituaries

Francis De Kresz, 74, president of the Hungarian-Canadian Federation of Professional Engineers, died June 16 at Toronto, Ont. In Toronto since 1948, he had been a consulting engineer with the consulting firm of R. P. Allsop & Associates, Ltd., Toronto. He went to Canada in 1947 after communists took over his business at Budapest. He had been a professional engineer for 52 years.

Davison Sutherland, 69, city engineer of Toronto, Ont., died July 7. He was due to retire after nearly 50 years of civic service. A graduate in engineering from the University of Toronto, Mr. Sutherland joined the Toronto engineering staff in 1914. In 1946 he was appointed roadways engineer and in 1954, deputy city engineer.

John Charles Riedel, 84, retired chief engineer of New York City's Board of Estimate, died in his home in Brooklyn July 1. President of the New York State Society of Professional Engineers between 1935-1937, Mr. Riedel devoted 51 years of service to New York City, rising to chief design engineer with the Brooklyn Bureau of Sewers in the early 1900s before he began a long association with the Board of Estimate in 1934. He retired in 1952, still vigorous and alert. Mr. Riedel was a long time member of the City Planning Commission and at 76 became chairman of the City Traffic Commission. A native of New York City, he received BS and CE engineering degrees from Cooper Union and lectured there and at Brooklyn Polytechnic Institute for many years. He held high office and committee posts in the National Society of Professional Engineers, American Society for Testing Materials, American Society of Civil Engineers and various local engineering societies.

Merle James McGruder, 60, former Lexington city engineer and former member of the Kentucky State Highway Department, died recently at Daytona Beach, Fla.

Virgil Jaggers, Sr., 69, construction engineer of West Point, Ky., died July 10 in Louisville.

Edward W. Brown, 71, vice president and chief engineer, Kentucky Utilities Co., Lexington, died July 18 in Lexington. He had joined the Old Dominion Power Co., a subsidiary of Kentucky Utilities, in 1917, becoming chief engineer for Kentucky Utilities in 1927 and vice president in 1939.

LIMA

When fast mobility counts... depend on LIMA truck-mounted cranes

LIMA truck-mounted cranes guarantee you the equipment mobility you need to reduce profitless trip time between jobs. They give you, too, the *on-the-job* mobility that makes a job go faster for greater profit to you. In addition to mobility, LIMA truck cranes offer you these important benefits:

They are completely versatile . . . as a shovel, crane, dragline, pullshovel.

They are available in 6 x 4, 6 x 6, 8 x 4 and 8 x 6 carriers with capacities up to 60 tons.

LIMA truck cranes are engineered for peak performance under the most rugged conditions . . . without costly maintenance downtime.

Truly, no other machine gives you as much as LIMA. You'll know why when you investigate. Call your nearby LIMA distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

COMPARE! No other machine gives you as much as LIMA!

1. *Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.*
2. *All gears, smaller parts and shafts which are subject to extra wear are flame or induction hardened for longer life.*
3. *Main machinery is placed well back of center of rotation to eliminate excess counterweight.*
4. *Propel and swing gears and power take-off are enclosed in sealed oil bath for dirt elimination and smoother, quieter operation.*
5. *Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.*
6. *Travel from job to job at automotive speeds.*
7. *Torque converter (optional) automatically adjusts speed to load requirements—minimizing shock loading, making performance smoother and faster.*

Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (½ to 6 cu. yds.), cranes (to 110 tons) and draglines variable.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

BALDWIN-LIMA-HAMILTON

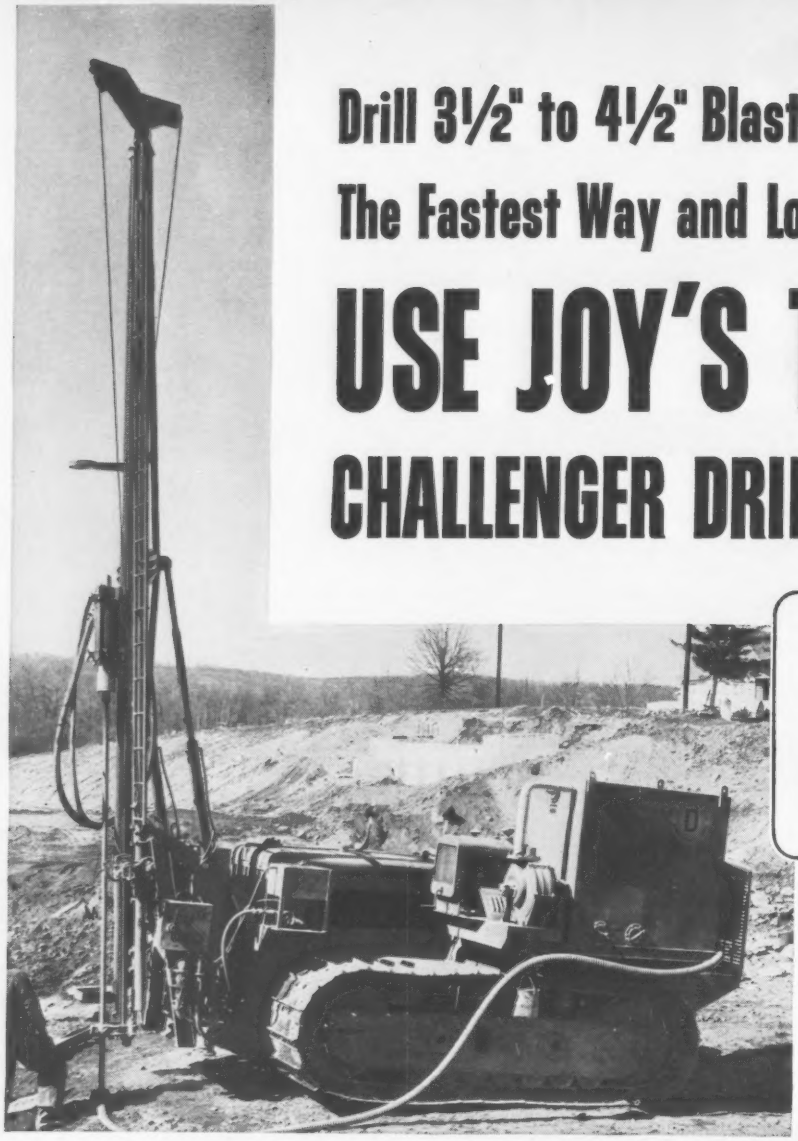
Construction Equipment Division—LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

Lima Type 74-T truck crane and a Lima Type 802 crawler-mounted crane, equipped with 100′ booms, erecting a gas line at a steel plant.

Two Lima Type 54-T truck cranes, equipped with 40′ and 50′ booms, setting 31-ton, 50,000 gallon capacity tank.

Lima Type 44-T truck crane, equipped with a 90′ boom, placing concrete on a new junior high school building, Dallas, Texas.



Drill 3½" to 4½" Blast Holes The Fastest Way and Lower Your Costs

USE JOY'S TWM-3 CHALLENGER DRILL PACKAGE

Easy to mount on a wide variety of chassis . . . drills 3½" to 4½" holes to 50 ft. depth or more

Package consists of:

- **JOY TM-500 DRILL AND MAST**
- **AIR MOTOR-DRIVEN CHAIN FEED**
- **AW-80 AIR WINCH FOR HANDLING STEELS**
- **CONVENIENT MOUNTING BASE AND CLAMPS**

This proven percussion blast-hole drill package, pioneered by Joy, replaces three or four wagon drills . . . *and still boosts the tonnage of broken rock per shift.* The rugged heavyweight drill, the most powerful in its class, sinks 3½" to 4½" holes to depths of 50' faster than any other machine of its type. It fits to a crawler-mounted tractor, truck, or any mobile chassis that will support its weight. You can select used equipment for mounting the rig, keeping initial cost low. Mast and levelling jacks operate from double-acting, hydraulically controlled cylinders. Operating range from 15° to either side of vertical and 15° forward of vertical permits quick setup and hole spotting. Get the specs and full story on this mobile, money-saving rig by writing to ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WRITE FOR FREE BULLETIN 192-24

JOY . . . EQUIPMENT FOR CONSTRUCTION . . . FOR ALL INDUSTRY

PORTABLE COMPRESSORS

WAGON DRILLS

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HAND-HELD ROCK DRILLS

WSW C6774-192

Scott Field Illinois Extends Runway

For overlayment of taxiway and runway at Scott Air Force Base, Belleville, Ill., the $1,006,233 contract went to Alpha Asphalt Co., East St. Louis, on close bidding. Work is for U. S. Engineers, Chicago, with DeLeuw Cather & Co., also of Chicago, as consultants.

Minimum wages in this "high cost" area range from $2.75 for common labor to $3.65 per hour for skilled work.

The three bidders were:

1C	Alpha Asphalt Co., East St. Louis, Ill.	$1,006,233
2	McCann & Co., Inc., Springfield, Ill.	1,031,726
3	Maclair Asphalt Co., Inc., E. St. Louis, Ill.	1,067,193
EE	Chicago Dist., Corps of Engrs, Chicago, Ill.	810,194

Bids: 5-28-57 Items	Unit	Quantity	Unit Prices 1C	2
Excavation general	cy	71,000	$0.74	$2.00
Topsoiling, 5" thick	sy	67,800	0.11	0.25
Remov exist airfld pave: flexible	sy	400	3.90	6.00
concrete	sy	400	2.50	8.00
PC conc pave 8" overlay	sy	10,822	10.00	7.00
replacement	sy	400	20.00	20.00
Portland cement	bbl	4,617	4.00	3.50
Base crse replace, 5" upper	sy	400	6.00	4.00
10" upper	sy	243	11.00	6.00
Bituminous coat prime	gal	250	0.40	0.50
tack	gal	16,500	0.20	0.30
Bitum course surf	t	3,355	13.25	14.00
binder	t	3,468	12.90	13.00
base	t	5,807	12.90	13.00
Sand asph surface course	t	35	40.00	5.00
Asphalt cement	gal	189,962	0.10	0.11
Dble bit surf trtmt rplcmt	sy	45	2.00	5.00
Airfield marking	ls	job	3,000	5,000
Fertilize & seed	ac	14	325.00	300.00
Storm drains, CP C-76T2 or smooth int CMP 8ga, 96"	lf	78	107.12	100.00
CP C-76T1 or SICMP 8ga, 96"	lf	1,065	94.71	100.00
CP C-76T2 or SICMP 8ga, 78"	lf	550	86.52	100.00
CP C-76T1 or SICMP 8ga, 78"	lf	2,190	75.11	85.00
CP C-76T1, 48"	lf	29	30.68	25.00
CMP 12ga, 48"	lf	14	27.50	25.00
16ga, 24"	lf	19	17.00	15.00
12"	lf	13	28.50	15.00
CP C-75, 15"	lf	12	16.00	15.00
Remov exist 44" x 72" CMP arch culvert	ls	job	4,000	2,000
CM multiplate arch culverts, 2-11'-7"x7'-5"	ls	job	31,451	18,000
Special manhole #1	ls	job	3,434	2,200
#2	ls	job	5,123	2,800
#3	ls	job	5,837	2,800
#4	ls	job	5,236	2,500
#5	ls	job	5,293	2,500
#6	ls	job	4,740	2,200
Special structure #1	ls	job	58,180	40,000
#3	ls	job	11,012	10,000
Control structures	ea	2	9,178	6,000
Conc pav ditch 6" thick incl gravel filter crse 6" thick	sy	3,145	995	20
Adjust exist manholes	ls	job	1,910	2,000
Altns to exist watr mns	ls	job	21,420	3,000
Comb conc crb & gut rplcmt	ls	job	1,575	2,000
Conc sidewalk rplcmnt	ls	job	690	2,000
Encase gas transmissn line	ls	job	51,500	30,000
Modify exist stm manholes	ls	job	23,810	5,000

Completion Schedule: 400 calendar days
Liquidated Damages: $50 per calendar day

Run and Taxiways at Birmingham Airport

This $1,171,747 contract for extension of the NE-SW runway and construction of parallel taxiways on the north and south sides of the runway, went to Harbert Construction Corporation for a contract price 4.6% below the second low bid and 16.3% below the engineers' estimate. Goodwin Engineers, Inc., Birmingham, Alabama are the consulting engineers.

This 2450 ft runway extension, together with an 1850 ft extension under construction, will provide a 10,000 ft long runway designed for instrument landing. The runway is 150 ft wide and the taxiways are 75 ft wide.

Specifications call for class A concrete requiring a cement content of 6.35 bags per cu yd for coarse aggregate ranging from 1½" to No. 4, and 6.70 bags per cu yd for coarse aggregate ranging from 1" to No. 4.

Paving accounts for 53% of the contract price. Excavation takes 28%, drainage facilities take 7%, while the remaining 12% goes for electrical ducts, trenches, marker lights and seeding.

Wages prevailing in Birmingham include: common labor on heavy construction $1.60 per hour, truck drivers $1.60 to $2.05, tractor operators $2.66, electricians $3.175.

Bidders include:

1C	Harbert Constr Corp., Birmingham, Ala	$1,171,747
2	Hewitt Constr Co., Columbus, Ga.	1,228,354
7	Warren Bros. Roads Co, Nashville, Tenn	1,401,435
EE	Goodwin Engineers Inc., Birmingham, Ala	1,400,000

Bids: 4-4-57 Items	Unit	Quantity	Unit Prices 1C	2
Excav, uncl	cy	130,000	$0.35	0.40
borrow	cy	600,000	0.48	0.55
Crushed agg base crse, 16"	sy	20,730	3.20	3.10
9"	sy	35,100	1.80	1.72
8"	sy	57,050	1.60	1.60
4"	sy	23,772	0.80	0.83
Select base material, 8"	sy	57,080	0.80	0.25
Bit base crse, 4"	sy	54,830	1.35	1.53
1½"	sy	55,670	0.54	0.60
Blend nat limestone & sand bit surf crse, 1"	sy	53,740	0.57	0.60
1½"	sy	54,260	0.81	0.88
Bit prime coat	gal	33,000	0.18	0.20
tack coat	gal	27,800	0.20	0.22
Runway & taxiway conc, 10"	sy	23,557	6.15	6.30
RCPES, 66"	lf	279	33.00	40.00
48"	lf	234	19.25	20.00
30"	lf	200	9.05	10.00
RCPSS, 66"	lf	661	29.50	35.00
54"	lf	505	22.50	28.00
48"	lf	215	17.25	18.00
30"	lf	208	8.30	9.00
24"	lf	1,200	5.80	7.00
18"	lf	1,770	4.00	4.50
15"	lf	1,200	3.35	4.00
Rock exc in pipe trenches	cy	100	10.00	5.00
Conc inlets, type I	ea	10	400.00	300.00
type II	ea	5	900.00	435.00
Concrete, structure	cy	15	125.00	85.00
Clearing and grubbing	ac	24	425.00	200.00
Fence, remove & store	lf	2,000	0.40	0.20
reset	lf	1,000	1.00	1.00
furn & install	lf	7,700	2.75	3.00
Seeding	ac	95	110.00	150.00
Duct, undergr, conc encased 8 way 4"	lf	110	10.00	9.70
4 way 4"	lf	400	5.00	5.20
2 way 4"	lf	1,270	3.50	3.30
2 way 3"	lf	100	3.50	3.20
Lights, runway mrkr, hi inten clear	ea	8	375.00	425.00
clear /yellow	ea	16	385.00	425.00
green	ea	6	400.00	440.00
elev mrkr for taxiway, compl with transfrmr	ea	163	110.00	118.00
Trench cable	lf	43,000	0.22	0.36
Cable in trench, 1/8, 3000V	lf	11,000	0.20	0.175
1/8, 600V	lf	136,000	0.17	0.145
1/6, 600V	lf	5,000	0.20	0.07
1/8, bare	lf	26,000	0.10	0.08
1/4, bare	lf	11,000	0.12	0.12
Trans vlt & equip, lp	ea	4	1,000	200
Bright control 37½ KVA trans assemb & cnt equip incl 4KW static tp regulators	ls	job	9,000	.00 11,000
Marking & striping	ls	job	1,200	4,883
Pavt, exist, cut & repl	lf	500	3.00	2.00

Time to complete: 210 calendar days.
Liquidated damages: $200 min per calendar day.

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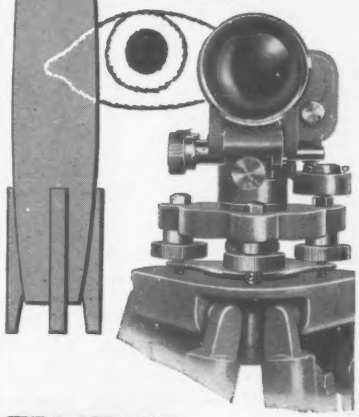

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Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Iron and Steel Products: Last, July 11; Next, Aug. 15
- Wood Products, Glass, Explosives, Chemicals: July 18: Next, Aug. 22
- Clay Products, Lime, Plaster, Paint, Roofing: Last: July 25; Next, Aug. 29
- Wage Rates, Building Board, Lath, Insulation: Last, Aug. 1; Next, Aug. 29

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash, dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.* truckload del.* per block		CONCRETE Ready Mixe
	Paper	Bulk	Mortar	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	1:2:4 del. 50 cy & ove
Atlanta	$4.31a	$3.90a	$3.57	$2.18	$2.28	$2.50‡	$2.18	$2.33	$1.55	$1.65	$0.175	$....	$13.75g
Baltimore	4.42c	4.01c	3.49c	2.80‡a	2.80‡a	2.25‡a	2.85‡a	2.90‡a	2.05‡a	2.00‡a	.18	.18a	12.95/13.45
Birmingham	4.08	....	....	2.53n	2.53n	2.13n	2.75	2.75	1.55	1.65	.18	.18	12.55
Boston	5.75be	4.67a	4.79a	3.00a	3.00a	3.00a	1.75a	1.85a	....	....	.23	.275a	15.00k
Chicago	4.13a	3.72a	3.65/3.78	3.78‡b	3.78‡b	4.13‡b	3.95‡b	3.95‡b	2.25‡	2.25‡	.25	.255	13.50
Cincinnati	4.46c	4.05c	4.03	2.29‡c	2.34‡c	2.34‡c	2.64‡c	2.64‡c	1.89	1.89	.19	.24a	13.25
Cleveland	N.A. in C.L.	....	3.88a	3.15ef	1.95f	1.65	4.50‡a	4.50‡a	3.35‡a	3.35‡a	....	.23	16.15
Dallas	3.55a	3.15a	3.43	2.60	2.65	1.90	2.43	2.63	....	....	....	.27	11.25
Denver	4.69a	4.19a	4.69	1.90	2.05	1.20	....	....	....	....	.22/	.245a	10.70
Detroit	4.10a	3.60ag	3.73	4.50‡b	4.50‡b	4.25‡b	3.75‡	3.75‡	3.50‡	3.50‡	.23	.24a	14.20
Kansas City	4.45i	3.95a	4.25	....	....	1.70‡a	2.00‡a	2.00‡a	....	....	.31a	.34c	13.50
Los Angeles	5.12ch	4.58ch	5.60	2.41‡a	2.76‡a	2.41‡a	2.41‡a	2.46‡a	....	....	.14/m	.24m	12.96h
Minneapolis	4.40a	4.00a	4.07	2.70‡ag	2.70‡ag	1.60‡ag	3.25‡ag	3.25‡ag	....	....	.19	....	14.30f
Montreal	3.21d	2.96d	3.60	1.95‡a	2.20‡a	2.25‡a	1.95‡i	2.20‡i	2.00	2.00	.20	.20a	10.80ni
New Orleans	3.75a	3.45a	3.70	2.44	2.44	2.00	....	....	1.45	1.65	.275	....	13.65
New York	4.69a	4.38a	4.28	3.05‡k	3.05‡k	2.30‡k	2.90‡l	2.90‡l	....	....	.265	.325	17 35an
Philadelphia	4.49/4.84‡a	4.09/4.46‡a	3.70/4.33‡	2.85‡op	2.85‡op	2.35‡op	2.70‡	2.80‡	2.00	2.35	.24/.30	....	13.8'de
Pittsburgh	5.60be	4.47be	5.10be	3.40te	3.40te	3.80e	2.00e	2.00e	2.10	2.10	.26	.28	15 55
St. Louis	4 01/4.33c	3.61/3 93c	3.86/4.18	3.25am	3.10am	2.40/3.10am	1.60j	1.70j	....	....	.24	.30e	13.40/13.90
San Francisco	3.94c	3.54c	4.38c	2.02	2.02	2.12	2.17	2.17	....	....	.24	.28el	12.75e
Seattle	4.30a	3.75a	4.45a	4.00‡bm	4.00‡bm	4.00‡bm	4.50‡bm	4.50‡bm	....	....	.26	.37c	13.30j
Toronto	4.03	4.03	4.03	2.40‡	2.40‡	2.05‡	2.20	2.20	2.20	2.20	.25	.275c	15.20

‡ Delivered. * Prices incl. dealers discount except as noted.

CEMENT: *a Less 10¢ disc, 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc, 10 days. *d Truckload lots, deliv. 10¢ disc, 20 days. *e Truckload lots *f Fob mill, add 13.80 to $20.30 per car switching charges *g fob mill + freight *h LCL. *i Less % disc, 10 days

SAND GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons or more. *e ½". *f Pea gravel. *g Less 5% for cash. *h Less than 5 tons. *i Plus 5% mun. & prov. tax *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *o 1-3 mi zone. *p Add 10¢ for ea. add'l mi zone.

CONCRETE BLOCK: *a Cinder *b Waylite. *c Haydite. *d Celocrete *e 8½ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *i Less 2% for cash *l F.o.b. plant San Rafael. *m F.o.b. yard.

READY MIXED CONCRETE: *a 5 cu. yds. or over del. Man. *b 25 cu. yds or more *c 10-100 cy. brackets. *e 2,000 lb comp. *f 2,500 lb. comp. *g Less 25¢ disc, 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 5% mun. & prov. *l 1:2½:3½. *m F.o.b. yard. *n Plus escalator clause. *o Add 15¢ for ea. add'l 3-mi zone.

CASH DISCOUNTS CEMENT to Contractors: Truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10¢ per bbl. for payment within 15 days of date of invoice. Subject discount 10¢ per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For paper bags add 40¢ per bbl., not refundable.

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$3.30†	Buffington, Ind	$3.25†	Steelton, Minn	$3.45†	Muskegon, Mich	$3.30†	Toledo, O	$3.30†
Clinchfield, Ga	3.30†	Independence, Kan	3.10†	Leeds, Ala	3.15†	Saginaw, Mich	3.30†	Milwaukee, Wis	3.35†
Kingsport, Tenn	3.30†	Hannibal, Mo	3.35†	Duluth, Minn	3.45†	Wyandotte, Mich	3.30†	Green Bay, Wis	3.35†
West Des Moines, Iowa	3.35†	Northampton, Pa	3.35†	Hudson, N. Y	3.35†	Buffalo, N. Y	3.40†	Ironton, O	3.30†
Nazareth, Pa	3.35†	Universal, Pa	3.45†	Alpena, Mich	3.20†	Oswego, N. Y	3.45†	Montreal City	2.58†
Bath, Pa	3.35†	Waco, Tex. (+ 10¢ tax)	3.35†	Detroit, Mich	3.30†	Cleveland, O	3.35†	W. Winfield, Pa	3.45†
Lesley, Pa	3.35†	Giant, S. C	3.35†	Howes Cave, N. Y	3.35†	Alsen, N. Y	3.35†	Security, Md	3.35†

† *Prices to hold for third quarter of* 1957.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80-300 penetration		CUTBACK ASPHALT MC per ton		ROAD OIL Per gal.	ASPHALT EMULSION RSI Per gal.	
	Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 15-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	.....	.....	.....	$30.50	$45.00	$0.15	$0.26	$0.125Pw	$0.28Pw	$0.14	$0.125	$0.30
Baltimore	150.00‡	.....	.....	23.00i	.....	.095i	0.185i	.10iwE	.19iwE	.10i	.105i	0.195i
Birmingham	.....	62.00i	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston	.....	.....	.....	24.00ap	46.00ap	24.00as	46.00as	.11aFw	.24•Fw	.11ao	.174aGo	.25aGo
Chicago	150.00‡	90.00‡h	3.95/4.00‡j	24.25b	34.25b	21.40bv	31.40bv	.11bwH	.19bwH	.085b	.....	.....
Cincinnati	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	.....	82.00d	6.30g	25.00A	.....	25.00A	.....	.111bAwF	.....	.....	.111bAG	.21AG
Dallas	s	40.00	s	26.35	45.39	.1116	.1944	29.80	51.40	.1080	.1116	.1994
Denver	.....	56.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	115.00	.....	29.65	.....	29.65s	.....	.1285wI	.....	.1026	.....	.25
Kansas City	s	s	s	20.40cl	.....	20.40s	.....	.0925cwJ	.....	.085c	0.125c	.....
Los Angeles	s	.....	s	21.00dms	.....	21.00dxs	.....	22.50dxK	.....	21.50ds	.097	.197
Minneapolis	.....	.....	3.73h	29.50	.....	29.50	.....	0.125w	.....	0.115	.134	.....
Montreal	s	s	s	32.50n	44.80n	.176n	.226n	18.70nuE	23.70nuE	.154n	.242nu	.27nu
New Orleans	.....	.....	.....	20.00e	.....e	20.00es	.....e	.095ew	.....e	.065B	.095BL	.....
New York	.....	.....	3.70f	26.89qCD	47.32qD	26.89sCD	47.32sD	.1273wCDF	.2139wDF	.....	.1273CD	.2161D
Philadelphia	175/185	110/120	4.06	22.00	.....	22.00	.....	.095uF	.....	.095	.....	.....
Pittsburgh	60.00k	99.12l	6.35	28.30i	.....	30.90is	.....	.1351i	.....	.14	.1351i	.....
St. Louis	.....	.....	.....	32.90f	.....	.1825	.....	.1035fuM	.....	0.165	.825f	.....
San Francisco	.....	70.00c	.....	23.00g	40.00g	23.00gks	40.00gks	24.00gN	41.50gN	23.75ag	.10g	.19g
Seattle	.....	.....	.....	27.00s	40.50k	27.00s	.....	28.50K	.....	24.75kv	.10k	.11kr
Toronto	.....	123.00	4.50	40.10	59.38	0.2004	0.2445	0.214w	0.258w	0.198‡	0.216	.271

‡ Delivered.

PAVING BRICK & BLOCK: *b 3 x 4 x 8. *c 2¼ x 8¼ x 4. *d LCL, truck deliveries. *e Not used. *f 2" interior 6# treat. *g 3" *h 2" tr, 6# *i 3 x 3½ x 8½. *j 2½", 6 lb. tr. *k Used. *l Red shale; day $10.32. *m Pine; oak $6.57.

ASPHALTS: *a Price at plant, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segunda. *e F.o.b. Baton Rouge. *f F.o.b. Wood River, Ill. *g F.o.b. Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery. Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 penetr. *l Less than 100 penetr. *m 40/80 penetr. *n Fed. tax included; add 5% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *q 40/300 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 85/300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks. *y F.o.b. Oakland. *z F.o.b Edmonds. *A F.o.b. refinery, Cleveland. *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS, SS. *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095 *K MC 3, 4 & 5. *L MS. *M MC 1-5, RC 1-5, $0.106. *N MC 3. *O Truckload. *P F.o.b. refinery Savannah: $0.09/gal., tank cars; $0.20/gal., drums. *Q F.o.b. Eldorado, Ark. # Correction.

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, S. N. NOLAN, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

▲ **Conn., Hartford**—BA 8/19—The Greater Hartford Bridge Auth., 71 Capitol Ave., New Founders Bridge approaches and connectors, Hartford Side, 1,600 ft. c. conc. on riverfront section of Hartford-Springfield Expressway, north and south roadways, ramps and viaducts. $5,000,000. E. Lionel Pavlo, 7 E. 47 St., New York, N. Y., engr. John Mozzochi, 1533 Hebron Ave., Glastonbury, assoc. engr. CD 2/16/56, under Connecticut.

HEAVY CONSTRUCTION—LB & CA

▲ **Abner Rosenberg**, 142 Orange Ave., West Haven, Conn., Owner Builds. $3,500,000, 350,000 sq. ft., SHOPPING CENTER, SPRINGFIELD, MASS. Ryder, Struppman & Neumann, 90-04 161 St., Jamaica, N. Y., archts.

▲ **Abner Rosenberg**, 142 Orange Ave., West Haven, Conn., Owner Builds. $2,900,000. 200 HOUSES, ELLINGTON, CONN. Arnold Lawrence, 571 Porter St., Manchester, Conn., archt.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—LB & CA

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton,

S. J. Groves & Sons Co., U. S. Hy. No. 9, Woodbridge, LB $3,947,926 (6 bidders), constr. 2.3 mi. section of Interstate and Defense Freeway Route 101 between Route 15, at Wharton, and Mt. Hope-Rockaway Rd. in Rockaway Twp., Morris Co. Bids July 25. CD 7/19.

BUILDINGS—LB & CA

▲ **Walter Kidde Constructors, Inc.**, 140 Cedar St., New York, N. Y. CA $2,235,000, general contract one 3 story, 58x110 ft. and two 7 story, 54x135 ft. HOSPITAL wings, Easton Ave., NEW BRUNSWICK, N. J. St. Peter's Hospital, Bd. Trustees, Easton Ave., New Brunswick, N. J. Bids June 19. CD 7/8, under LB.

▲ **Dr. Arthur Widenmeyer**, Richboro, Pa. Separate Contracts. $5,000,000. 250-unit RESIDENTIAL DEVELOPMENT, Harmony Farms, Northampton Twp., RICHBORO, PA. J. G. Parks & Assoc., Washington Crossing, Pa., engrs.

▲ **Henry A. Knott**, 2406 Greenmount Ave., Baltimore, Md. CA $9,000,000, 900 HOMES in Palmer Development, LANHAM, MD. Frank Development Co., Inc., 1523 L St., N. W., Wash., D. C.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ **FLORIDA**—State Road Dpt., Tallahassee, Bids opened 7/23,

Fla.—**Duval Eng. & Contr. Co.**, Box 1588, Jacksonville, Fla., LB $214,829 (4 bidders), sand bit. road mix with mineral seal coat; surf. existing pavt. with mineral seal coat drainage structures, etc. 8.401 mi. from SR 210 to SR A-1-A at Ponta Vedra, FA Proj. No. S-478(1), Job No. 7860-250, SR S-210-A, St. Johns Co.; LB $890,445 (3 bidders), b. conc. surf. course with binder course; drainage structures; storm sewers, etc. 2.521 mi. in Jacksonville Beach and Neptune Beach from SR 212 to SR 10, SP Job No. 7210-113, SR Ala., Duval Co.;

Fla.—**C. T. Stockton, Inc.**, 660 N. W. 54th St., Miami 37, Fla., LB $445,392 (7 bidders), 8½ in. limerock base, Type 1-A surf. treat.; b. conc. surf. course; constr. concrete deck slab bridge on concrete pile bents, etc. 7.624 mi. from Lake Park north to Boy Scout Camp Road. SP Job No. 9309-109, SR A-1-A, Palm Beach Co.;

Fla.—**Coggin & Deermont**, Chipley, Fla., LB $335,158 (3 bidders), b. conc., surf.; sand asph. hot mix; drainage structures; wid'n. existing A.C.L. R.R. overpass; constr. 165 ft. concrete bridge on steel pile bents; 90 ft. timber detour bridge, etc. 2.509 mi. between point inside east city limits of Chattahooche and point approx. 2.5 mi. east, FAP Nos. FG-006-3(3) and F-006-3(6), Job Nos. 5001-301 and 5001-203, SR 10 (U.S. 90), Gadsden Co.;

Fla.—**Ryan Constr. Co.**, Rte. 5, Box 264, Tampa 4, Fla., LB $374,441 (6 bidders), surf. treat., constr. 240 ft. concrete slab deck bridge on concrete pile bents; quadruple 10 ft. x 7 ft. concrete box culvert, etc., 0.217 mi. at Taylor Creek north of Okeechobee, SP Job No. 9102-113, SR 15; replacing 12 timber bridges with concrete box culverts; replacing one timber bridge with 120 ft. concrete slab deck bridge on concrete pile bents, etc. 0.056 mi. between Martin Co. line and Okeechobee, Job No. 9105-105, SR 15, Okeechobee Co. CD 7/12.

▲ **MISSISSIPPI**—State Hy. Dpt., T. C. Robbins, dir., Jackson,

Miss.—**H & F Engineering Co., Inc.**, Gulfport, Miss., CA $957,053 est. $1,050,000, grading, bridge, base, c. conc. double base surf. treat., hot plant mix asph. pavt. 3.811 mi. U. S. Hy. No. 49 between Gulfport and Wiggins. Proj. U-008-1 (1), Harrison Co.;

Miss.—**Ford & Jones Constr. Co.**, Taylorsville, Miss. CA $191,492, est. $194,000, grading, draining, culverts, box bridge 7.185 mi. Miss. Hy. No. 531 between Taylorsville and Bay Springs, Proj. S-0335-(1) A, Smith Co.;

Miss.—**Mid-State Paving Co.**, Meridian, Miss. CA $103,989, est. $103,000, wid'n., base and double base surf. treat. 5.928 mi. Miss. Hy. No. 13 between Prentiss and Columbia, Proj. F-037-1 (8), Jefferson and Davis Counties;

Miss.—**W. E. Blaine & Son**, Mount Olive, Miss. CA $222,684, est. $238,000, grading, draining, culverts 12.195 mi. Miss. Hy. No. 613 between Lucedale and Moss Point, Proj. F-031-1 (2), George Co.;

Miss.—**Gerald Smith Co., Inc.**, Jackson, Miss. CA $421,856, est. $433,000, grading, grade separation structures, grav. base, double base surf. treat. 1.087 mi. U. S. Hy. No. 51 in Jackson. Proj. I-091-2 (13) Hinds Co. Grand total $1,897,074. Bids July 23. CD 7/12.

▲ **LOUISIANA**—State Hy. Dpt., Hy. Office Bldg., Baton Rouge,

La.—**John F. Beasley Constr. Co.**, Mercantile Bank, Dallas, Tex., CA $1,192,840. Carrollton Airline Interchange (Pontchartrain Expressway) Stage II, Rte. 3019, 0.49 mi. S.P. 283-08-05, FAP I-524 (4). Orleans Parish, CD 5/20, under LB;

La.—**Boh Bros. Constr. Co.**, 2400 Cypress St., New Orleans, La., CA $2,609,007. Mississippi River approaches (Pontcharatrain Expressway) Rte. 3019 Proj. 283-08-10, FAP FU 409 (10), Contr. No. 2, Orleans Parish. Bids May 8. CD 5/13, under LB.

▲ **LOUISIANA**—State Hy. Dpt., State Hy. Office, Baton Rouge,

La.—**Cook Constr. Co.**, Box 8466, Jackson, Miss., CA $1,788,120. West Atchafalaya Floodway Crossing Hy. Route La US 190, State Proj. 12-13-29 & 8-04-14, Fed. Aid Proj. F-169 (12), St. Landry Parish;

La.—**T. L. James & Co., Inc.**, Ruston, La., CA $1,392,854 Victory Dr. Interchange, Stage I, Route LA 3019, State Proj. 283-08-17, CTR. No. 3, Orleans Parish, CD 5/28, under LB; CA $789,387 Many-Hornbeck Hy., Route LA-US 171, State Proj. 25-02-11, Sabine Parish, CD 5/31, under LB;

La.—**R. B. Tyler Co.**, 2500 Poydras St., New Orleans, La., CA $732,830. Gretna-Belle Chasse Hy. Route LA 23, Proj. 62-01-07 & 62-02-27 Jefferson and Plaquemines Parishes, CD 5/28, under LB. Grand total $4,703,191. Bids May 22.

▲ **LOUISIANA**—State Hy. Dpt., Hy. Office Bldg., Baton Rouge,

La.—**T. L. James & Co. Inc.**, Ruston, La. CA $964,276, c. conc. 9.925 mi. Goldman-St. Joseph Hy. Rte. LA-US 65, SP 20-02-04, FA Proj. F-404 (7) Tensas Parish;

La.—**W. H. Patterson & Co.**, Box 2229, Baton Rouge, La. CA $527,103, wid'n. existing c. conc., bit. hot mix surf. 9.961 mi. Rte. LA 12, S. P. 12-05-02 and 12-04-16, F. A. Proj. F-389 (6) Beauregard and Calcasieu Parishes. Bids Apr. 24. CD 5/2, under LB.

▲ **Southern Builders, Inc.**, 495 W. 61 St., Shreveport, La. CA $1,147,789, water treatment plant and related facilities, BOSSIER CITY, LA. City, City Hall, Bossier City, La. Bids June 11. CD 6/14, under LB.

E. N. Murray, Buena Vista, Ga. CA $847,770, Contr. No. 1. general construction of water pipe lines, Terrebonne Parish, HOUMA, LA. Water Dist. No. 3, Houma, La. CD 5/20, under LB.

BUILDINGS—LB & CA

▲ **A. B. Newton & Co.**, Box 191, Vidalia, Ga. CA $1,295,000. low-rent HOUSING, Fla. 21-1 and 21-2, PAHOKEE, FLA. Pahokee Housing Auth., Box 918, Pahokee, Fla. Bids June 4. CD 6/11, under LB.

▲ **J. M. Brown Constr. Co.**, Box 102, Shreveport, La. CA $1,048,892. Men's and Women's DORMITORIES and DINING HALL alterations, Louisiana Polytechnic Institute, RUSTON, LA. State Bd. Educ., Baton Rouge, La. Bids July 17, awarded July 19. CD 7/25, under LB.

MIDDLE WEST

BUILDINGS—SLC

▲ **Wis., Milwaukee** — HOSPITAL — Milwaukee Hospital, 2200 W. Kilbourn Ave., soon lets contract 5 story hospital addn., $1,500,000-$1,750,000. Ebling, Plunkett & Keymar, 1220 N. Milwaukee St., Zone 2, archts.

HEAVY CONSTRUCTION—LB & CA

▲ **W. L. Johnson Constr. Co.**, Groveport, O., CA $1,663,553 (8 bidders) taxiways, parking lot, lighting, drainage, all utilities, new Port Columbus Airport Terminal Bldg., COLUMBUS, O. City, City Hall, Columbus, O. CD 9/19.

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., State Fair Grounds, Springfield,

H. H. Mass Constr. Co., Algonquin, Ill., CA $809,294, 7 span bridge over Kankakee River, F. A. Rte. 18, Kankakee Co. Bids June 21. CD 6/27, under LB.

▲ **Paschen Contrs., Inc.**, 2739 Elston Ave., Chicago, Ill., LB $1,852,737, Congress Expressway, 3 bridges, B. & O. R. R., C. T. R. R., C. & A. R. R.; LB $1,618,646, 31 St. grade separation over Cicero Ave., 7,239 ft. sewers, steel bridge, concrete paving, Chicago-Cicero, CHICAGO, ILL. Cook Co., County Bldg., Chicago, Ill. Bids June 25, CD 6/24;
States Imprvt. Co., 1305 S Ave., Maywood, Ill., LB $87,423, Hintz Rd. Bridge between Wolf Rd. and Milwaukee Ave., Wheeling, (Chicago, Ill.),

▲ **Paschen Contractors**, 2733 Elston St., Chicago, Ill., CA $1,857,237, grade separation, Congress St. Expressway at Central Ave. and B. & O. R. R. CD 6/24; CA $695,552, grade separation Congress Expressway at Central and Old Congress St. Grand total $2,981,963. CHICAGO, ILL. Cook Co., Chicago, Ill. CD 7/2, under LB;
Thomas McQueen Co., 1313 Circle Dr., Forest Park, Ill., CA $429,174, grade separation Edens Expressway exten., Wilson Ave. CD 7/9, under LB (Chicago, Ill.).

▲ **John C. Tully Co.**, 4833 32 St., Cicero, Ill., CA $1,157,799, Northwest Hy. storm drain, Keating Ave. to Pulaski Rd., CA $188,652, Northwest Expressway storm drain, Pulaski Rd. to Roscoe Ave., CHICAGO, ILL. Cook Co., Chicago, Ill. Awarded July 16.

▲ **Great Lakes Dredge & Dock Co.**, 228 N. LaSalle St., Chicago, Ill. LB $2,990,300 (2 bidders) bulkhead, dredging for Municipal Pier No. 2, MILWAUKEE, WIS. Bd. Harbor Comrs., Milwaukee, Wis. Bids July 23. CD 6/28.

▲ **MICHIGAN**—State Hy. Dpt., Charles M. Ziegler, state hy. comr., Stevens T. Mason Bldg., Lansing,

Mich.—**Denton Constr. Co.**, 20415 Mack Ave., Grosse Pointe, Mich., CA $2,697,975 est. $3,170,000 (12 bidders) dual 24 ft. concrete pav. and three bridges 5.809 mi. on Detroit-Toledo Expressway from Rockwood north, BI 82191 C1-RC (I 017-1 1) BI 82191 C2-RO (I 05-1 4) BI B6 and BI B9 of 82-1-23-C2-RO (I 017-1 1) Part II BI B11 of 82-1-23 C2-RO (I 05-1 4), Wayne Co.; CA $273,424 est. $340,000 (12 bidders), c. concrete and b. conc. 0.993 mi. M-47 to M-21 in Owosso, US 76011 C1 U (US 262 3), Shiawassee Co.;

Mich.—**Spartan Asphalt Paving Co.**, Holt, Mich., CA $187,197 est. $280,000 (13 bidders), b. conc. Class I 16.69 mi. on US 16 from railroad grade separation

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	Middle West
Middle Atlantic	West of Mississippi
South	Far West

PROPOSED WORK

Water Supply	Public Buildings
Sewers, Waste Disposal	Mass Housing
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

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east of East Lansing easterly and intermittently, M 33082 C1-R M 47061 C1-R, Ingham and Livingston Counties;

Mich.—**Dan S. Parr,** Manistee, Mich., CA **$82,182,** est. $100,000 (20 bidders), 22 ft. aggreg. surf. course 4.01 on FAS Rte 106 and ½ mi. west of Blanchard west, CS 54-42 CL (S 894 1), Mecosta Co.;

Mich.—**Cooke Contg. Co.,** 1116 Penobscot Bldg., Detroit, Mich., CA **$146,043** est. $190,000 (12 bidders) b. conc. 10.351 mi. West Co. line, Range St., Jeddo Rd. and Broad Bridge Rd., CS 77-86 C1 (S 994 1) CS 77-87 C1 (S 1215 1) CS 77-87 C2 (S 1206 1) CS 77-82 C2 (S 1225 2) CS 77-82 C3 (S 1225 3), St. Clair Co.;

Mich.—**H. J. Brighton,** Farmington, Mich., CA **$605,978** est. $700,000 (11 bidders), c. conc. Ramps Service Roads and approaches and street lighting on M-153 Ford Road at Southfield Road Grade separation. F 82061 C3-U (F 250 7), Wayne Co. Grand total $3,992,809, Bids May 8, CD 6/26.

BUILDINGS—LB & CA

Altman-Coady Co., 1251 Fairwood Ave., Columbus, O. CA **$913,444,** 4 story STUDENT NURSING WING with DORMITORY for 100 students, COLUMBUS, O. Mt. Carmel Hospital, W. Town St. and Davis Ave., Columbus, O. Financed by publicly voted hospital bond issue. Bids July 18. CD 7/25, under LB.

▲ **James E. McNamara Constr. Co.,** Carmel, Ind., Owner Builds. **$2,000,000,** 200 HOMES AND SHOPPING CENTER, Two Gaits Farm, near Mt. Carmel, CARMEL, IND.

▲ **Bert L. Smokler & Co.,** 1200 Penobscot Bldg., Detroit, Mich. Owner Builds. **$3,400,000,** 232 brick HOMES, Madison Acres, 12 mile Rd., east of Stephenson Hy., MADISON HEIGHTS, MICH.

WEST OF MISSISSIPPI

BUILDINGS—BA

▲ **Colo., Boulder**—CHEMISTRY—BA 8/13—University of Colorado, Campus, Boulder, 3 story, bsmnt., 106,000 sq. ft. chemistry bldg. addn. $1,750,000. Extended date. Huntington & Breisford, 370 W. 7 St., Denver, archts. Trautwein & Howard, 1411 Walnut St., Phila. 2, Pa., engrs. CD 7/3.

▲† **Mo., Fort Leonard Wood**—HOUSING—BA 8/15—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., 2,372 units of Capehart HOUSING, ENG-23-02-58-1 Proj. 085-81001. $20,000,000. Plans deposit $81. Robert R. Bayles & Assocs., 5833 Woodson St., Misson, Kan., engrs. Marshall & Brown, 1016 Baltimore Ave., Kansas City, Mo., archts. CD 7/11.

▲ **Mo., St. Louis County**—SCHOOL—BA 8/15—English Benedictines, St. Louis Priory, Dom Columba Cary-Elwes O.S.B. Prior, **Mason Rd. south of Conway Rd.,** Creve Coeur (selected list of bidders), 2 story, part bsmnt., 60x133 ft. brick, masonry blocks, steel, bar joists, concrete etc., monastery, and 1 story, 125x106½ ft. and 41x85 ft. gymnasium in connection with Catholic Preparatory School for Boys, Hellmuth, Obata & Kasabaum, Inc., 315 N. 10th St., Zone 1, archt. CD 2/5.

▲ **Tex., Wichita Falls**—HOSPITAL—BA 8/15—Bd. for Texas State Hospitals & Special Schools, c/o Dr. J. A. Bethea, exec. dir., 4405 Lamar St., Austin, hospital addn. $1,000,000. Plans deposit $100 for 2 sets. Extended date. Preston M. Geren, 1607 Fort Worth National Bldg., archts. CD 7/10.

▲ **Colo., Colorado Springs**—COURT HOUSE—BA 8/20—El Paso County Bldg. Auth., Court House, 5 story, bsmnt., 81,000 sq. ft. court house. $1,585,000. Earle A. Deits, 413 Mining Exchange Bldg., engr.-archt. CD 2/7.

HEAVY CONSTRUCTION—LB & CA

▲ **MISSOURI**—State Hy. Comn., Jefferson City, Mo.,

Mo.—**Clarkson Constr. Co.,** 4133 Gardner Ave., Kansas City, Mo., CA **$1,841,020,** graded earth and two 24 ft. c. conc. 7.263 mi. Boone Co.;

Mo.—**Reno Constr. Co.,** P.O. Box 61, Overland Park, Kan., CA **$917,769,** graded earth, culverts and b. conc. 7.986 mi. Camden Co. Bids May 24. CD 6/5, under LB.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 7/24,

Tex.—**Reynolds & Huff,** P. O. Box 88, Tyler, Tex. LB **$115,083,** grading, structures, base and surf. 5.066 mi. Hy. FM 317 Proj. S. 806 (2), Henderson Co.;

Tex.—**Fred Hall & Son,** P. O. Box 488, Valley Mills, Tex. LB **$89,811,** grading, structures, base and surf. 2.321 mi. Hy. FM 1181 Proj. S. 1989 (2), Ellis Co.;

Tex.—**W. H. Moser Constr. Co.,** P.O. Box 569, Paris, Tex. LB **$319,087,** flex. base and two course surf. treat. 6.71 mi. Hy. FM 195 & Loop 286. Proj. S. 282 (2) & S. 2156 (1), Lamar Co.;

Tex.—**Border Constr. Co.,** P. O. Box 647, Laredo, Tex. LB **$129,856,** grading, structures, base and surf. 5.511 mi. Hy. FM 335. Proj. R. 830-2-4, Real Co.;

Tex.—**Dew Constr. Co., Inc.,** P. O. Box 641, Tyler, Tex. LB **$87,504,** soil cement base and surf. 5.764 mi. Hy. FM 79. Proj. C. 688-2-13, Lamar Co.;

Tex.—**The Jarbet Co.,** P. O. Box 5008, San Antonio, Tex., LB **$910,706,** flex base, hot mix b. conc. 11.932 mi. Hy. SH 36. Proj. C. 186-5-6, Washington Co.;

Tex.—**T. L. James & Co., Inc.,** P. O. Box 531, Ruston, La., LB **$947,627,** foundation course, c. conc. pavt. 4.329 mi. Hy. U. S. 77. Proj. IN. 597(12), Cooke Co.;

Tex.—**Cage Brothers,** 6959 San Pedro Ave., San Antonio, Tex., LB **$1,208,877,** flex. base, hot mix b. conc. 8.81 mi. Hy. U. S. 80. Proj. I. 525 (7), Mitchell Co.;

Tex.—**Southwestern Constr. Co.,** 1219 Cotton Exchange Bldg., Dallas, Tex., LB **$134,609,** grading, structures, base surf. 5.405 mi. Hy. FM 939. Proj. S. 1500(1), McLennan Co.;

Tex.—**Henry L. Stafford**, P. O. Box 1047, Lubbock, Tex., LB $127,171, grading, structures, base and surf. 10.794 mi. Hy. FM 652. Proj. S. 1578(2), Loving Co.;

Tex.—**Hugh McMillan**, P. O. Box 1227, El Paso, Tex., LB $89,303, grading, structures, base and surf. 3.968 mi. Hy. RM 2462, Proj. S. 2197 (1), Brewster Co.;

Tex.—**John T. Leslie**, Bailey, Tex., LB $218,222, grading, structures, base and surf. 7.085 mi. Hy. FM 151. Proj. C. 202-2&1-8&5, Fanning and Grayson Counties;

Tex.—**South Texas Constr. Co.**, P. O. Box 3536, Corpus Christi, Tex., LB $170,767, grading, structures, base and surf. 6.022 mi. Hy. FM 444. Proj. C. 840-1-3, Victoria Co.;

Tex.—**Lange & Lowman Constr. Co.**, P. O. Box 506, Brenham, Tex., LB $73,884, flex. base shoulders, one and two course surf. treat. 10.307 mi. Hy. U. S. 69. Proj. C. 199-8-4 & C. 200-1-17, Angelina Co.;

Tex.—cancelled bids to have been opened June 24, grading, storm sewers, cement stab. base, concrete pavt., etc. 1.787 mi. Hy. Loop 137. Proj. I. 1057(8) & U 1057 (9), Harris Co. CD 7/9.

▲ **TEXAS**—State Hy. Comn., Austin,

Tex.—**Cage Brothers**, 6959 San Pedro Ave., San Antonio, Tex. CA $1,208,877 flex. base, hot mix b. conc. 8.81 mi. Hy. U. S. 80, Proj. I.525 (7), Mitchell Co.;

Tex.—**T. L. James & Co., Inc.**, P. O. Box 531, Ruston, La. CA $947,627, foundation course c. conc. 4.329 mi. Hy. U. S. 77. Proj. IN. 597 (12) Cooke Co. Bids June 24, awarded July 26. CD 7/29, under LB.

▲† **Robert E. McKee**, P. O. Drawer 562, El Paso, Tex. LB $2,157,300, retaining wall facing, at Air Force Academy, IFB 05-613-57-39, COLORADO SPRINGS, COLO. Dpt. Air Force, Box 1670, Colorado Springs, Colo. Bids July 23. CD 6/27.

BUILDINGS—LB & CA

▲ **Robert Danneberg**, 4942 Baltimore St., Kansas City, Mo. CA Est. $3,500,000-$4,000,000, 240 HOUSES, near O'Brien Rd., east of Hy. 50, LEE'S SUMMIT, MO., City Homes, Inc., 1111 Grand Ave., Kansas City, Mo.

W. S. Bellows Constr. Corp., 716 N. Everton, Houston, Tex. CA $968,600, SHOPPING CENTER addn., Beechnut and Post Oak Rds., HOUSTON, TEX. Meyerland Plaza Shopping Center, 4703 Jason St., Houston, Tex. CD 7/11.

▲ **J. C. Boespflug Constr. Co.**, P. O. Box 1237, Billings, Mont. CA $1,576,507, est. $1,540,000, 1 story, 35,000 sq. ft., 50 bed HOSPITAL, 20,000 sq. ft. in REHABILITATION CENTER, THERMOPOLIS, WYO. Hot Springs County Hospital, Court House, Thermopolis, Wyo. Bids June 27, awarded July 22. CD 7/9.

FAR WEST

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 7/25,

Guy F. Atkinson Co., 10 West Orange Ave., South San Francisco, Calif., LB $5,748,745 (11 bidders) grading, paving and 9 structures, 12 retaining walls for 8-lane divided freeway in Culver City and Los Angeles, 3.6 mi. between 0.2 mi. south Venice Blvd. and 0.3 mi. north Ohio Ave. VII LA 158 CIC LA, A, Los Angeles Co. CD 6/24.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 7/25,

Calif.—**R. E. Hazard** and **W. F. Maxwell**, Cabrillo Freeway at Friars Rd., San Diego, Calif., LB $1,368,476 (4 bidders) about 1.1 mi. graded, surf., rein.-conc. box girder bridge in San Diego between 0.4 mi. south Washington St. and Barnett Ave., SI S. D.-2; S.D., San Diego Co.;

Calif.—**Fischbach & Moore, Inc.**, 646 North Beachwood Dr., Los Angeles, Calif., LB $154,300 (4 bidders) traffic signal sys., hy. lighting and channelization in Long Beach and Lakewood on Lakewood Blvd. between Carson and South Sts., VII LA 168, 178, LBch, Lkw. LBch, Los Angeles Co.;

Calif.—**Sully-Miller Contg. Co.**, 1500 West 7th St., Long Beach, Calif., LB $162,246 (6 bidders) about 0.9 mi. graded and surf. over cement treated base and existing surf. in Los Angeles Co. and city of Long Beach on 7th St. between Bellflower Blvd. and Los Cerritos Flood Control Channel, VII L.A. 179, LBch, A, Los Angeles Co. CD 7/1.

▲† **Earl H. Parker, Inc.**, 12th & F. Sts., Marysville, Calif., LB $2,259,333; on alternate bid for use of cobblestones, est. $2,318,683 (5 bidders) levee constr. and stone protection, left bank Sacramento River, Tisdale Weir to Sutter Bypass, Sutter Co., CALIFORNIA. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids July 25. CD 7/8.

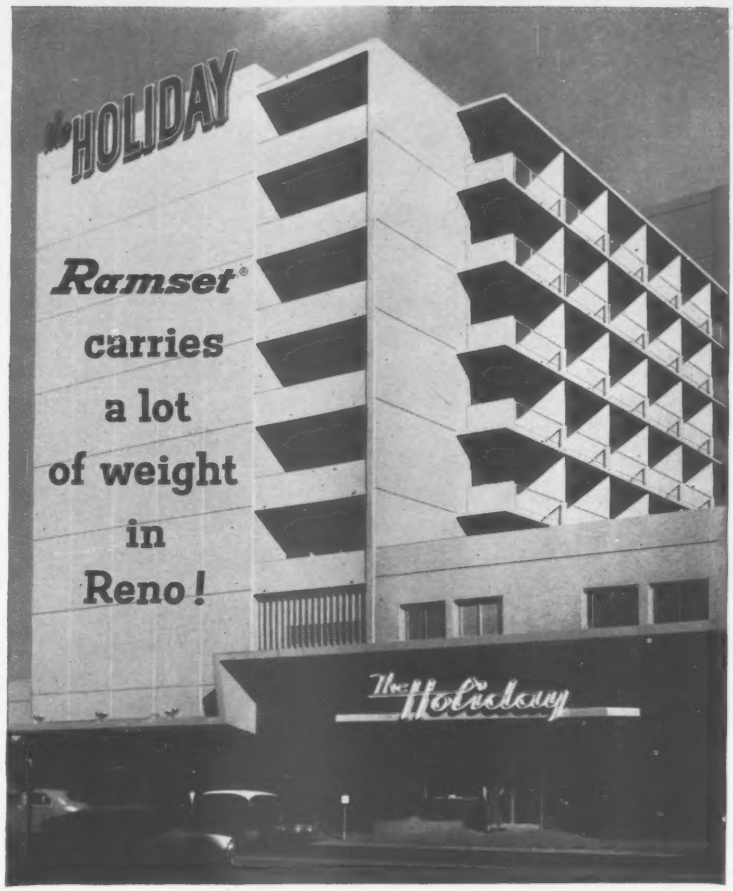
BUILDINGS—LB & CA

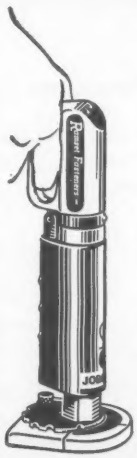
▲ **Howard Constr. Co.**, P. O. Box 416, Murray 7, Utah, CA $1,085,000, general contract Northwest JUNIOR HIGH SCHOOL, SALT LAKE CITY, UTAH. Salt Lake City Bd. Educ., 440 East First South St., Salt Lake City, Utah. Bids Apr. 23, awarded Apr. 24. CD 5/3, under LB.

▲†.**C. H. Levell**, 1900 Wyoming Ave., El Paso, Tex., CA $3,217,000, constr. TECHNICAL BLDG., Army Electronic Proving Ground, ENG-04-353-57-89, FORT HUACHUCA, ARIZ. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids May 21. CD 5/24, under LB.

▲ **MacDonald Eng. Co.**, 885 Bryant St., San Francisco 3, Calif., CA $1,338,000, SILO, PACKING HOUSE, DOCK, railroad sidings, equipment, WEST SACRAMENTO, CALIF. Ideal Cement Co., c/o General Engr., Denver National Bank Bldg., Denver 2, Colo. CD 2/13.

(Continued on page 88)





Signs for Reno's new Holiday Hotel weigh 2800 pounds—a lot of weight in *any* city! How to fasten them was a problem, until the contractor turned to RAMSET.

John Severne, foreman for Cosgriff Sign Co., Reno, wanted fasteners that would *hold!* He knew these seven-foot, 200-pound letters might shake loose from the strong winds (and *blasts!*) coming out of the desert unless they were securely anchored.

Ramset Saved 9 Hours and 20 Minutes!

Using a RAMSET DUO-JOBMASTER®, it took only 20 minutes per letter! He saved a total of 9 hours and 20 minutes over old-style methods, used only 52 fasteners, and did the job quickly and safely!

With RAMSET there are no power lines to drag up and down. No need to drill and plug holes. RAMSET is light enough to handle with one hand, and you can carry charges and fasteners in your pocket.

There's a RAMSET fastener and tool for *your* fastening job. You can get a free pocket guide to the RAMSET system from your dealer. He's listed under "Tools" in the yellow pages of your phone book.

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WINCHESTER-WESTERN DIVISION
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ON THE CONNECTICUT TURNPIKE

No place for trucks you have to "baby"! Gammino's Macks are hauling close to *seven million* yards of rock and earth as the Connecticut Turnpike is rushed to completion. That means those mighty shovels are really moving as they drop the heavy, jarring loads of rock into the trucks beneath. It also means that Gammino's Macks are taking tremendous punishment, both from the hustling shovels and from the makeshift roadbeds over which they operate in an endless loading-dumping cycle.

"Sure, it's backbreaking work for any other truck," says Mr. Gammino. "That's why we use Macks."

No job's too tough for Gammino,

because... THEY D

Want the real pitch on Mack can-do?

Ask Frank Gammino of M. A. Gammino Construction Company, Providence, Rhode Island. He'll talk Mack with you all afternoon.

Ask him about the small but important jobs, where Mack economy enables him to deliver at a profit.

Ask him about the big jobs, where the power and schedule-meeting dependability of his Macks pace the entire operation.

And ask him about the really rugged jobs—the chassis-jolting rock-loading jobs . . . the up-to-the-hubs-in-mud jobs . . . the jobs where his Macks work round the clock, rushing out big-yardage loads for weeks on end without a break or a breakdown.

Then ask him why he has still *more* Macks on order. We'll stand on that. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

YEAR AFTER YEAR IN THE U.S.A., MACK DIESEL TRUCKS OUTSELL ALL OTHER

ON THE PROVIDENCE RIVER BRIDGE JOB

Gammino's Macks are keeping big buckets busy. Concrete, not excuses, is what this job calls for—any late deliveries mean expensive, profit-robbing delays. "With Macks on the job," says Mr. Gammino, "no one sits on his hands."

DEPEND ON MACKS

ON OVER-THE-ROAD HAULING OF CRUSHED STONE AND DIRT

. . . a wise contractor keeps a close eye on running costs—fuel, maintenance, down time, tire wear, etc. Mr. Gammino does just that, and he reports: "Nothing touches a Mack for ton-mile economy."

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first name for
TRUCKS

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b. ALL electrodes, in . . .
c. Any and all positions

How is this performance possible? THE MILLER GOLD STAR SR introduces a...
NEW transformer
plus
NEW weld stabilized current
plus
NEW completely sealed semi-metallic rectifier

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Tested across the country by practical, critical, hard-bitten working weldors, here's what they say about the new Miller GOLD STAR SR:
"it's the DC performance I've always wanted"
"here's DC welding current that's . . . perfect!"
"positively handles ALL electrodes better"
"best deal I've seen for v and o work"
"easiet arc starting in my experience"
"smoothest arc I ever used . . . and . . . quiet!"
"it's just plain the MOST"
Complete particulars on the MILLER GOLD STAR SR, including inert gas and automatic fixture welding, is now available on request.

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Subsidiary—Barium Steel Corporation

(Continued from page 85)

CANADA

BUILDINGS—SLC

▲ **Ont. Toronto**—REFINERY SUPERSTRUCTURE—BA 8/7—Canada & Dominion Sugar Co. Ltd., 91 Tecumseh St., Chatham, soon lets contract, superstructure for sugar refinery expansion on 10-acre site at foot of Jarvis St. $6,000,000. Gordon S. Adamson & Assocs., 52 St. Clair Ave. E., Toronto, archts. H. G. Acres & Co. Ltd., 1259 Dorchester Rd., London, Engrs. CD 4/16.

HEAVY CONSTRUCTION—LB & CA

MANITOBA—Manitoba Govt., Legislative Bldg., Winnipeg, **Commonwealth Constr. Co., Ltd.**, 300 Royal Bank Bldg., Winnipeg, Man., LB $988,595 (2 bidders) surf., stab. course 17.1 mi. Trans-Canada Hy. in municipality of North Norfolk.

BUILDINGS—LB & CA

▲ **Grosvenor-Laing (BC) Ltd.**, 640 W. Hastings St., Vancouver, B. C., CA $8,500,000, COPPER MILL to produce seamless copper, brass and bronze tubing and pipe for condenser and heat exchangers, refrigeration, automotive, water supply, Annicis Industrial Estate, VANCOUVER, B. C. Western Copper Mills Ltd., 1955 W. Broadway, Vancouver, B. C. B. D. Bohna & Co., Ltd., 1070 Hornby St., Vancouver, B. C., engrs. CD 1/13/56.

▲ **J. L. Guay & Frere Ltee.**, 6900 Cote des Neiges Rd., Montreal, Que., CA $2,500,000. 4 story, 38x178 ft., main building, 40x147 ft. chapel and two 38x200 ft. wings, rein-con., brick Old People's HOME, LeFoyer Rousselot, Sherbrooke St. E., MONTREAL, QUE. Rev. Grey Nuns, Mother House, 1190 Guy St., Montreal, Que. Awarded July 22. CD 7/16, under LB.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., Goleta**—Goleta County Water Dist., Goleta, Goleta West extension to El Capitan water sys. to serve 6,000 acres to be known as Imprvt. Dist. No. 2, 8 mi. main pipe line and 7 mi. branch lateral. $2,000,000. James M. Montgomery, 535 E. Walnut St., Pasadena, consult. engr.

▲ **Calif., San Luis Obispo**—State Div. Architecture, 1120 N. St., Sacramento, constr. reservoir and water distr. sys. for San Luis Obispo Campus, California Men's Colony near San Luis Obispo and other public agencies, Dpt. State Polytechnic College for Dpt. Educ. $3,600,000.

▲ **Tex., Mesquite**—City, City Hall, WW $1,500,000. CD 2/6.

SEWERS, WASTE DISPOSAL

▲ **Conn., Essex**—Town, Town Hall, sewerage sys. $3,000,000. Bowe, Albertson & Assocs., 75 West St., New York, N. Y., consult. engrs.

▲ **Conn., Old Greenwich**—Town of Greenwich, Town Hall, Greenwich, sewage treatment plant, $1,000,000, Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., consult. engrs. CD 12/18.

▲ **O., Cleveland Heights**—City, City Hall, 2953 Mayfield Rd., Cleveland, Zone 18, bond election Nov. 5, sewer imprvs. $2,500,000. Harry C. Gallimore, 3482 Lee Rd., Cleveland, Zone 20, consult. engr. CD 11/9.

▲ **Tex., Mesquite**—City, City Hall, sanitary sewers. $1,000,000. CD 2/6.

BRIDGES

▲ **New York and New Jersey**—Port of New York Authority, 111 Eighth Ave., New York 11, N. Y., 6-lane lower deck George Washington Bridge over Hudson River, $167,000,000. To go ahead in 1958. Test borings in fall. CD 1/20/55.

▲ **O., Hamilton**—City, City Hall, bond election Nov. 5, underpass at South Hamilton crossing. $2,500,000. CD 11/1/43.

▲ **Tex., Orange**—Orange Co., c/o Courthouse, bridge constr. on County Main Rd. $1,000,000.

STREETS AND ROADS

▲ **Calif., Stockton**—City, City Hall, grade separation at El Dorado and Center Sts., $2,321,600. To go ahead in 1961.

▲ **Mich.**, Van Dyke-Warren Twp., Arthur Miller, superv., 22720 Van Dyke Ave., 73 mi. paving and wid'n main roads, in Warren, $9,715,000.

▲ **O., Hamilton**—City, City Hall, bond election Nov. 5, street imprvs. in all sections of city. $1,000,000. CD 11/12.

▲ **O., Kettering**—City, City Hall, 2,090,000 bond election Nov. 5, streets. CD 5/27.

▲ **Tex., Mesquite**—City, City Hall, street imprvs., paving. $1,250,000. CD 2/6.

▲ **Tex., Orange**—Orange Co., c/o Courthouse, road constr. $3,750,000.

EARTHWORK, WATERWAYS

▲ **Calif., Lakeport**—Lake Co., c/o Bd. Supervs., Courthouse, proposed Middletown Proj. (water conservation proj.) 110 ft. high dam and reservoir for storing, 5,000 acre ft. of water, near here. $1,000,000.

▲ **Colo., Denver**—Denver Water Bd. Comrs., City & County Bldg., hydro-electric power plant on S. Boulder

(Continued on page 90)

Rough, broken ground creates no problem for Tractair. Equipment is driven to any point on the site, transporting all necessary tools in its own trailer.

Augering crew preparing to drill beneath the sidewalk for water and sewer lines, using Tractair power.

Contractor Finds 6 Ways to Use Tractair*

Multi-purpose tractor-compressor keeps busy all day on home-building project.

High mobility reduces moving and set-up time — two big money-wasters.

Hutchinson Homes, of Denver, Colorado, had a program calling for the completion of 1,650 brick-veneer homes in just one year and nine months. The job was spread over plenty of real estate and demanded a mobile power source that could quickly move from site-to-site providing power for many types of work.

Hutchinson Homes chose the Le Roi Tractair 125 to fill the bill.

Hutchinson Homes already owned a Tractair 105. They'd had it in steady service for five years before it got its first overhaul. That kind of performance proved Le Roi had the dependability they needed.

Reduces Dead Time

One Tractair was needed full time for augering water and sewer lines beneath the freshly-paved sidewalks. A big problem in work of this type was that moving and setup time is greater than drilling time. Tractair's high mobility substantially reduced this dead time, kept two men busy augering.

The other Tractair and a Le Roi 105 portable air compressor kept busy drilling, breaking, augering, chipping and trimming concrete, tamping, and powering an impact wrench.

Speeds Job Completion

Tractair's mobility and versatility enabled the operators to move rapidly and easily from house to house, performing a wide range of jobs while saving time and manpower. It contributed strongly to the rapid completion of this large housing project well within the time schedule.

Tractair can bring this same usefulness to your next job. Write us today for complete information and data on this tractor-compressor.

*"Tractair" is the registered trademark for Le Roi's combination tractor—air compressor.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, portable and Tractair® air compressors, stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

Withdrawing a pile with a McKiernan-Terry E4 Pile Extractor hung from a steel strongback suspension that exerts downward pressure on the pile next to the one being removed. The cable strongbacks and a cable from the cross-bar to a deadman give the unit additional strength. McKiernan-Terry Corporation, 80A Richards Ave., Dover, N. J.

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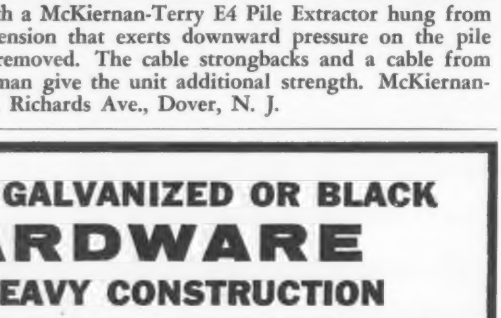

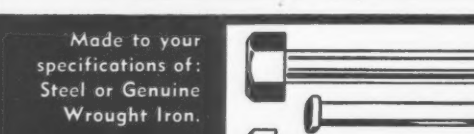

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(Continued from page 88)

Creek, 5 mi. east of Gross Reservoir incl. power plant, hydro-electric turbines, etc. near here, $2,000,000. Power Conduit No. 22, incl. approx. 4 mi. on penstocks for hydro-electric power plant at Gross Reservoir on South Boulder Creek, near here, $3,000,000. John Burggess, c/o owner. ch. engr.

▲ **Ill., Belleville**—City, Jerome Munie, mayor, City Hall, flood control sys. to protect city against overflowing of Richland Creek and its tributaries, etc. $3,500,000.

AIRPORTS

▲† **Colo., Colorado Springs**—HOUSING—Dpt. Air Force, Air Force Academy, Constr. Agency, P. O. Box 1670, plans by Skidmore, Owings & Merrill, archts.-engrs., 3333 N. El Paso St., 1,256 family housing units at Air Force Academy. $20,000,000. CD 3/1.

▲ **Mo., St. Louis**—TERMINAL BUILDING—City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12th and Market Sts., Zone 3, fourth domed-unit for Terminal Bldg., at Lambert-St. Louis Municipal Airport on Natural Bridge Rd., St. Louis Co. $1,900,000. Landrum & Brown, 111 E. 4 St., Cincinnati, O., airport consults. (for studies) CD 6/29/44.

▲† **Tex., Corpus Christi**—HOUSING—U. S. Govt., c/o Naval Auxiliary Air Station, Port Isabel, Title VIII, 86 Capehart Housing units, for civilian and naval personnel at Corpus Christi Naval Auxiliary Base and Radar Station. $1,000,000. CD 8/21.

FOREIGN

▲ **Saudi Arabia**—Govt. of Saudi Arabia, Riyadh, plans 465 mi. 32 in. water pipe line from Sua-al-Shuyukh east of Barah on Euphrates River to Riyadh, with purification plant near Iraq border and several pumping stations. $30,000,000. Government is seeking international consulting firm to make surveys.

▲ **Thailand**—Royal Irrigation Dpt. Govt. of Thailand, Bangkok, plans 154 meter high, 467 meters long concrete arch dam north of Bangkok. Bids will be asked when negotiations with World Bank are completed. U. S. Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., U. S. A., consult. engrs.

AMERICANS ABROAD

▲ **Formosa**—Nationalist Govt. of China, Taipeh, plans Shihmen reservoir with 125 meter high dam with canal intake, west of Taipeh on Takenkan Creek for flood control power and water supply. $50,000,000. Tippetts-Abbett-McCarthy-Stratton, 62 W. 47 St., New York, N. Y., U. S. A., consult. engrs.

PUBLIC BUILDINGS

▲ **Arizona**—HOUSING—Bureau Reclamation, Dpt. Interior, Kanab, Utah, 200 houses at Glen Canyon Damsite, Page, Ariz. Colorado Storage Proj. $2,000,000.

▲ **Ariz., Phoenix**—COURT HOUSE, etc.—General Service Admin., 18th and F Sts., Wash. 25, D. C., courthouse and federal office bldg., N. 1st Ave., W. Monroe, N. 2 and W. Van Buren Sts. $8,000,000.

▲ **Calif., Arcata**—ADMINISTRATION, etc.—State Div. Architecture, 1120 N. St., Sacramento, administration and business education bldg. $884,800; field house and natatorium $530,500, Humboldt State College.

▲ **Calif., Atascadero**—WARD BLDGS.—State Div. Architecture, 1120 N St., Sacramento, ward bldgs., Atascadero State Hospital, Dpt. Mental Hygiene. $1,949,800.

▲ **Calif., Chico**—LIBRARY—State Div. Architecture, 1120 N. St., Sacramento, library, $1,184,800, Chico State College, for Dpt. Educ.

▲ **Calif., Davis**—RESIDENCE HALLS—University of California, Bd. Regents, Administration Bldg., Berkeley constr. Residence Hall, Unit 3, $427,000; Residence Hall, Unit 4, $1,885,000, Davis Campus.

▲ **Calif., Escondido**—SCHOOL—Escondido Union High School Dist., Escondido, bond election Oct. 1, library, gymnasium, music bldg., shop bldgs. and 20 classrooms at Escondido High School. $1,555,000. CD 6/26/56.

▲ **Calif., Fresno**—SPEECH-DRAMA—State Div. Architecture, 1120 N. St., Sacramento, speech-drama bldg. $2,066,250; physical education facilities $107,700; boiler addn. $81,250, Fresno State College.

▲ **Calif., La Jolla**—LABORATORY—University of California, Administration Bldg., Berkeley, Laboratory bldg., La Jolla Campus, $1,426,000.

▲ **Calif., Long Beach**—COLLEGE—State Div. Architecture, 1120 N. St., Sacramento, home economics bldg., $417,900 classroom bldgs. $2,525,000; outdoor physical educ. facilities $428,500; site development $184,150; residence halls, $749,160, Long Beach State College, Dpt. Educ.

▲ **Calif., Los Angeles**—PHYSICAL EDUCATION—State Div. Architecture, 1120 N. St., Sacramento, constr. physical education bldg., $2,290,300; outdoor physical educaton facilities, $749,800; site development, $452,300. at Los Angeles State College of Applied Arts and Sciences, San Bernardino Freeway Campus, for Dpt. of Education.

▲ **Calif., Los Angeles**—SCIENCE, etc.—State Div. Architecture, 1120 N. St., Sacramento, constr. science bldg., $4,653,600; fine arts bldg., $2,467,000; residence hall, $790,000. Los Angeles State College of Applied Arts and Sciences, San Fernando Valley Campus, for Dpt. Education.

▲ **Calif., Los Angeles**—PHYSICS BLDG., etc.—University of California, Administration Bldg., Berkeley, alter physics bldg., **$518,500;** constr. Franz Hall addn., **$1,332,900;** addn. to geology bldg. **$945,617;** service yard addns. **$541,000;** residence hall, Unit 2, **$2,328,300.**

▲ **Calif., Napa**—JUVENILE UNIT, etc.—State Div. Architecture, 1120 N. St., Sacramento, juvenile unit **$2,553,000;** industrial and maintenance shops, **$173,700;** water supply imprvs. **$74,700,** Napa State Hospital, for Dpt. Mental Hygiene.

▲ **Calif., San Bernardino**—OFFICE—State Div. Architecture, 1120 N. St., Sacramento, state office bldg., for Dpt. Finance. **$1,334,200.**

▲ **Calif., San Diego**—SCIENCE, etc.—State Div. Architecture, 1120 N. St., Sacramento, science bldg. **$3,189,100,** addnl. boiler and mechanical work **$171,100;** physical science bldg. addn. **$1,649,900,** residence halls, **$2,300,350,** and **$1,580,000,** San Diego State College for Dpt. Education.

▲ **Calif., San Dimas**—LIBRARY, etc.—State Div. Architecture, 1120 N. St., Sacramento, library bldg. **$1,446,550,** addnl. agriculture units **$457,700,** site development **$293,500,** business classroom bldg. **$693,000,** corporation yard **$287,900,** residence halls, **$2,297,500** and **$790,000.** California State Polytechnic College, Kellogg-Voorhis Campus, near here, for Dpt. Education.

▲ **Calif., San Francisco**—COLLEGE—State Div. Architecture, 1120 N. St., Sacramento, constr. fine arts bldg. addn., **$582,000;** science bldg. addn. **$1,901,600.** San Francisco State College, for Dpt. Education.

▲ **Calif., San Francisco**—PARKING STRUCTURE—University of California, 2130 Fulton St., Parking structure, **$1,405,000.**

▲ **Calif., San Jose**—HOSPITAL—Bd. Supervs. Santa Clara Co., Civic Center, 1st and Rosa Sts., plans by Stone, Mulloy, Maraccini & Patterson, 619 California St., San Francisco, third stage, Santa Clara County Hospital. **$1,985,000.**

▲ **Calif., San Jose**—COLLEGE—State Div. Architecture, 1120 N. St., Sacramento, art bldg. **$1,816,000;** industrial arts bldg. **$2,595,300;** health bldg. **$1,176,300;** faculty office bldg. **$409,300;** student activities bldg. **$650,900.** CD 4/26/43; residence halls **$4,740,000,** San Jose State College, for Dpt. Educ. CD 11/22/55.

▲ **Calif., San Luis Obispo**—PHYSICAL EDUCATION, etc. State Div. Architecture, 1120 N. St., Sacramento, men's physical education bldg. **$1,712,500,** home economics bldg. **$1,137,400,** agriculture classroom bldg. **$1,567,800,** residence halls **$3,159,200** and **$1,580,000,** State Polytechnic College, San Luis Obispo Campus, for Dpt. Educ.

▲ **Calif., San Luis Obispo**—SECURITY FACILITY—State Div. Architecture, 1120 N. St., Sacramento, California. medium security facility, Men's Colony for Dpt. Correction. **$10,761,000** (partial cost).

▲ **Calif., Santa Barbara**—RESIDENCE HALL—University of California, Administration Bldg., Berkeley, Residence Hall Unit 2, **$1,600,000;** Residence Hall, Unit 3, **$1,980,000,** Santa Barbara Campus.

▲ **Calif., Santa Clara**—HIGH SCHOOL—Santa Clara Union High School Dist., c/o Supt., Santa Clara, plans by L. F. Richards, 1033 Jackson St., partly wood frame, partly steel frame, Emil Buchser High School (incl. gym). **$1,500,000.**

▲ **Calif., Tracy**—VOCATIONAL INSTITUTION—State Div. Architecture, 1120 N. St., Sacramento, constr. reception guidance center, Deuel Vocational Institution, for Dpt. Correction. **$2,527,700.**

▲ **Conn., New Britain**—HOME FOR AGED—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Henry E. Ludorf, 95 Elm St., Hartford, addn. at New Britain Memorial Hospital to be used as Home For Aged. **$1,750,000.** Original plan of separate home to cost **$2,395,000,** abandoned. Hubbard, Lawless & Blakeley, 110 Whitney Ave., New Haven, consult. engrs. CD 3/30/56.

▲ **Iowa, Council Bluffs**—SCHOOL—Bd. Educ., Council Bluffs, Junior High School in northeast section of city, **$1,443,000.** CD 2/20/56.

▲ **Mass., Boxford**—SCHOOL—Masconomet Regional School Dist. Comn., Towns of Toosfield, Middleton and Boxford, plans by Rich & Tucker Assocs., 45 Newbury St., Boston, Regional Jr.-Sr. High School, Endicott St. **$2,500,000.** Site changed. CD 5/1, under Mass., Topsfield.

▲ **Mass., Springfield**—SCHOOL—City, Dpt. P. Bldgs., City Hall, plans by Morris W. Malony, 220 Dwight St., Springfield, Junior High School. $2,400,000. Constr. 1958.

▲ **Mich., Ann Arbor**—DORMITORIES—University of Michigan, Ann Arbor, four 6 story women's dormitories, with 3 story central section. **$5,500,000.**

▲ **Mich., Berkley**—SCHOOL—City, Bd. Educ., 2325 Catalpa St., Berkley, plans by Earl G. Meyer, 806 Farwell Bldg., Detroit, Zone 26, high school, Greenfield St., between Catalpa and 11 Mile Rd., **$2,500,000.** CD 10/26/54.

▲ **Mich., Dearborn**—LABORATORY, etc.—Regents of University of Michigan, Harold M. Dorr, dean of Statewide Education, Ann Arbor, 1 and 2 story engineering laboratory, **$1,598,000;** 1 story class room and basic science bldg., **$1,142,000;** faculty office bldg., **$534,000;** activities library bldg., **$650,000;** roads and utilities, **$1,500,000.** CD 2/1.

▲ **Mich., Madison Heights**—SCHOOL—City, F. Foster Williams, supt. Schools, plans by George D. Mason & Co., 409 Griswold St., Detroit, high school, 11 Mile Rd., between Lorenz and Couzens Sts. **$1,500,000.**

▲ **Minn., Bemidji**—PHYSICAL EDUCATION, etc.—State Dpt. Admin., 19 State Capitol, St. Paul, plans by Jyring

TECHNICAL REPORT NO. 1
and smooth surfaced dumb-bell type waterstops
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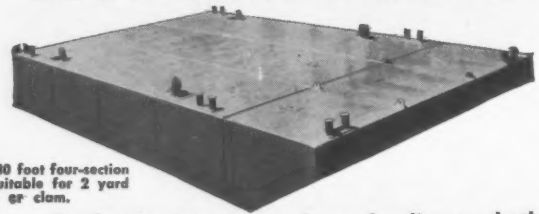

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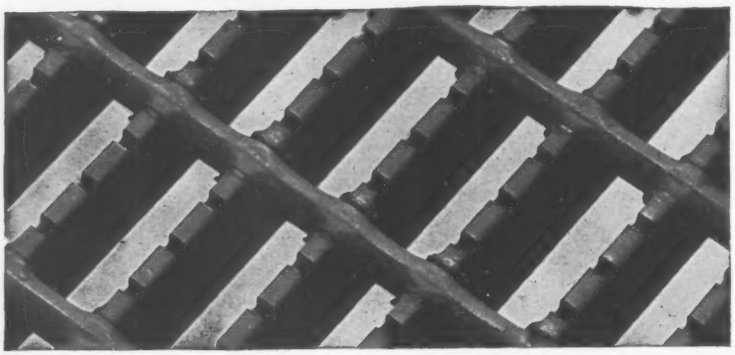

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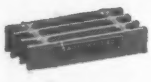

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& Whiteman, Hibbing, physical educ. and industrial arts bldgs., at Bemidji State College, $1,000,000. CD 7/3.

▲ **Minn., Mankato**—DORMITORIES—State College Bd., 41 Sherburne Ave., St. Paul, plans by Schmidt-Peterson-Stevenson, Mankato, two dormitories at Mankato State College. $2,000,000. Funds appropriated. CD 1/25/56.

▲ **Minn., Mankato**—LABORATORY, etc.—State Dpt. Admin., 19 State Capitol, St. Paul, plans by Graffunder-Nagle & Assocs., 688 Sexton Bldg., Minneapolis, laboratory bldg. $1,200,000; plans by Bergstedt & Hirsch, 2706 West 7th Blvd., St. Paul, science and arts bldgs. expansion, $1,200,000; plans by Fasth, Hillstrom & Horty, 910 Midland Bank Bldg., Minneapolis, physical educ. bldg., $455,000, at Mankato State College. CD 7/3.

▲ **Minn., St. Cloud**—SCIENCE, etc.—State Dpt. Admin., 19 State Capitol, St. Paul, plans by Traynor & Hermans, St. Cloud, science and mathematics bldg., at St. Cloud State College, $1,150,000. CD 7/3.

▲ **Mo., Warrensburg**—DORMITORIES—Central Missouri State College, Bd. Regents, Warrensburg, plans by Everitt & Keleti, 4550 Main St., Kansas City, Mo., 4 story, 45 x 207 ft. rein. con. Men's and Women's Dormitories. $1,000,000. Bids late in August. CD 6/5.

▲ **N. Y., Astoria**—SCHOOL—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, plans by Seelig & Finkelstein, 153 Pierrepont St., Brooklyn, Zone 2, Proj. E-112, Junior High School 141 addn., modernization, $1,725,000. CD 10/22/48.

▲ **N. Y., Brooklyn**—SCHOOL—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, plans by Raymond Irrera & Assoc., 42-15 Crescent St., Long Island City, Proj. E-109, P.S. 256, vicinity of Tompkins Park, $2,900,000. CD 5/20.

▲ **N. Y., Brooklyn**—SCHOOL, etc.—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, plans by Horace Ginsbern & Assoc., 205 E. 42 St., New York, Zone 17, Proj. E-146, P.S. 213 addn. and modernization, $1,470,000. CD 5/23.

▲ **N. Y., Brooklyn**—SCHOOL—Bureau Constr. Bd. Educ., 42-12 Crescent St., Long Island City, plans by Katz, Waisman, Blumenkrantz, Stein & Weber, 551 Fifth Ave., New York, Zone 17, Proj. E-384, P.S. 46, vicinity of Park and Vanderbilt Aves. $2,500,000. CD 5/20.

▲ **N. Y., Flushing**—COLLEGE—Bd. Higher Educ., 695 Park Ave., New York, Zone 21, plans by De Young, Moscowitz & Rosenberg, 205 E. 42 St., New York, Zone 17, Proj. HN-56 Academic Bldg. No. 1, $4,000,000; plans by Ketchum, Gina & Sharp, 227 E. 44 St., New York, Zone 17, Proj. HN-96, cafeteria bldg., $850,000, both at Queens College.

▲ **N. Y., New York**—SCHOOL—Bureau Constr., Bd. Educ., 42-15 Crescent St., Long Island City, plans by York & Sawyer, 101 Park Ave., Zone 17, Proj. E-907, Junior High School 136, vicinity of Prospect Ave. and Jennings St. $3,600,000. CD 5/16.

▲ **N. Y., New York**—SCHOOL—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, plans by Maurice Courland & Sons, 2 W. 89 St., Zone 24, Proj. E-402, P.S. 28, vicinity of St. Nicholas Ave. and W. 156 St. $2,600,000. CD 5/30.

▲ **N. Y., New York**—SCHOOL—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, plans by William F. R. Ballard, 123 E. 77 St., Zone 21, P.S. 32 vicinity of Washington Ave. and East 168 St., Proj. E-774. $2,450,000.

▲ **N. Y., New York**—HOSPITAL—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Charles B. Meyers Assocs., 31 Union Sq., Zone 3, Proj. HO-59A, Metropolitan Hospital Nurses Residence and Training School, 99 St. and FDR Drive, $3,000,000. CD 6/10.

▲ **N. Y., New York**—SANITATION CENTER, etc.—Dpt. P. Wks., Municipal Bldg., Zone 7, Proj. S-144, site preparation for Harlem Sanitation Center, incl. incinerator and garage for Dists. 9, 10 and 12, on Hudson River between W. 132 St. and W. 134 St. $2,275,000. Feld & Timoney, 60 E. 23 St., Zone 10, engrs. CD 1/11.

▲ **O., Akron**—OFFICE, etc.—Comrs. Summit Co., Court House, plans by Trefon Sagadencky, 429 Chestnut St., combined office bldg. and jail, $1,750,000; work farm bldg. at county home, $200,000; remodeling courthouse $1,000,000. Revised estimated. CD 7/24.

▲ **O., Avon Lake**—SCHOOLS—Avon Lake Bd. Educ., Avon Lake, bond election Nov. 5, Junior or Senior High School. $1,600,000; existing schools repairs and addns., $400,000.

▲ **O., Cleveland** — COURT HOUSE — Comrs., Cuyahoga Co., Court House, Zone 13, bond election Nov. 5, county court house, criminal courts bldg. and juvenile court remodeling and expansion, $4,000,000. CD 5/21/56.

▲ **O., Cleveland**—BOARD OF ELECTIONS—Comrs. Cuyahoga Co., Court House, Zone 13, bond election Nov. 5, building to house County Board of Elections. $1,250,000.

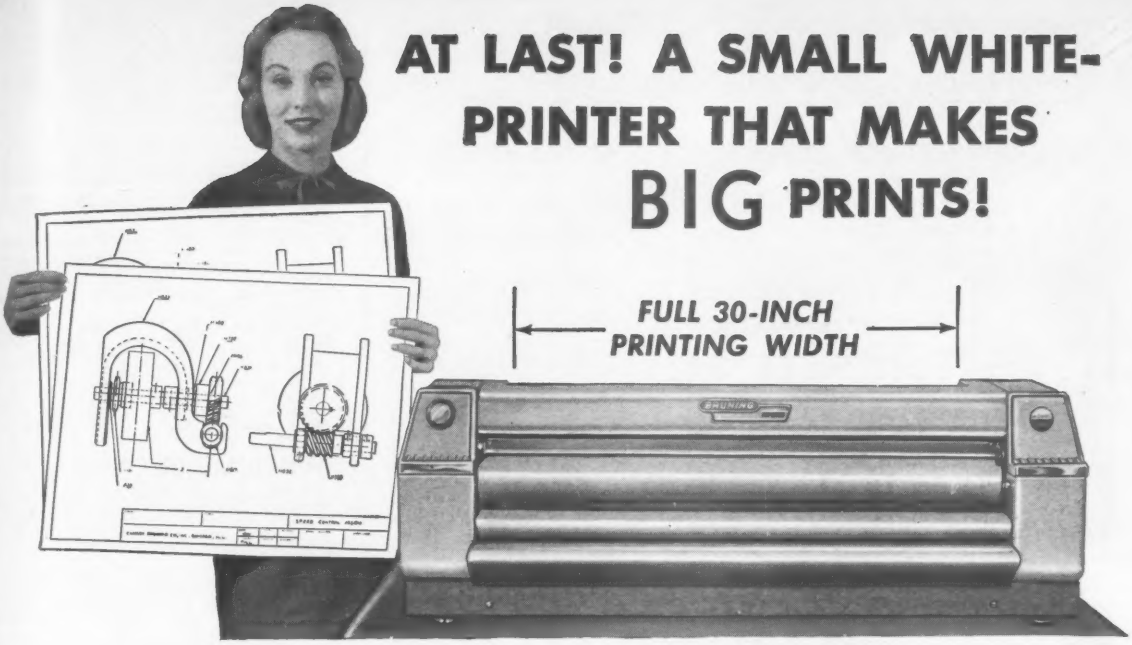
▲ **O., Dayton** — JUVENILE CENTER — Comrs. Montgomery Co. Court House, $1-mill 2-year tax levy to be voted on Nov. 5, new juvenile center, juvenile and domestic relations courts, $1,500,000. CD 11/14/55.

▲ **O., Fremont**—HOME FOR AGED—Comrs. Sandusky Co., Court House, bond election Nov. 5, county home for aged, $1,160,000. Olson & Powers, Fremont, archts. CD 11/12.

▲ **O., Kettering**—SCHOOLS—Bd. Educ., Kettering, bond election Nov. 5, schools. $2,500,000. CD 1/22.

▲ **O., Ravenna**—COURT HOUSE, etc.—Comrs. Portage Co. Court House, $1,500,000 bond election Nov. 5, court house, office bldg. and jail facilities. CD 11/11/55.

(Continued on page 94)



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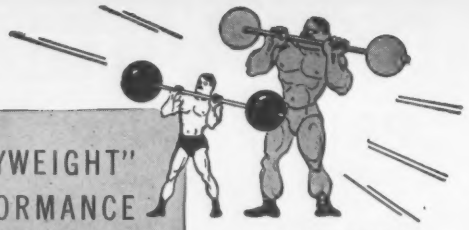

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(Continued from page 92)

▲ **O., South Euclid**—SCHOOLS—South Euclid-Lyndhurst Bd. Educ., 4777 Farnhurst Rd., bond election Nov 5, Junior High School. $2,500,000. CD 11/8/54.

▲ **O., Tiffin**—SCHOOLS—Bd. Educ., Tiffin, $1,975,000 bond election Nov. 5, high school, remodeling Columbia High School into Junior High School, remodeling present Junior High School.

▲ **O., Toledo**—STUDENT UNION—University of Toledo, W. Bancroft St., Toledo, plans by Bellman, Gillett & Richards, 1600 Madison Ave., 2 story, 100x200 ft., stone student union bldg. $1,000,000.

▲ **S. D., Watertown**—SCHOOL—Bd. Educ., Watertown, defeated $1,850,000 bonds June 18. Senior High School.

▲ **Tex., Brownsville**—MOTEL—Cameron Co., c/o Comrs. Court, c/o Cameron Park Bd., Brownsville, plans by Marshall D. Barnett, 7242 Lakewood St., Dallas, 120 units holiday Inn Resort Motel, incl. swimming pool, 500 auto parking center on Padre Island, $1,100,000. CD 7/10.

▲ **Tex., Lubbock**—DORMITORIES—Texas Technological College, Lubbock, 268 student capacity dormitory $1,250,000; 250 student dormitory $915,000; 200 student dormitory $750,000.

▲ **Wash., Tacoma**—SCHOOL—School Dist. No. 1, S. 8 and Tacoma Sts., plans by R. B. Price, 2907 A St., high school in South Tacoma, near S. 66 St. and S. Tacoma Way. $1,000,000. Work may start next year.

COMMERCIAL BUILDINGS

▲ **Ark., Little Rock**—SHOPPING CENTER—Fausett Enterprises, E. L. Fausett, pres., plans by Richard W. Groh, 807 West 3rd St., 40 shops and stores, incl. 3 story medical center, 2,430,000 sq. ft. floor space, Park Plaza Shopping Center, on 20 acre tract, $4,318,000. CD 2/2/55.

▲ **Calif., Shasta Springs**—HOTEL—Royal Hotels, Inc., c/o Louis Belotti & Stewart Mackenzie, developers, c/o Dunsmuir Hotel, Dunsmuir, block, cement, stucco, Shasta Royal Inn Hotel, incl. swimming pool. $2,000,000.

▲ **Ind., Syracuse**—HOTEL—Harold Van Orman, Sr. & Assocs., Van Orman Hotel, Fort Wayne, 2 story resort hotel, air-conditioned with swimming pool at Lake Wawasee, on south side of Lake, on former Waco site, near here. $1,000,000. Constr. this fall.

▲ **Iowa, Bettendorf**—SHOPPING CENTER—Martin Bucksbarm, 3700 1st Ave. S. E., Cedar Rapids, shopping center. $6,000,000.

▲ **Iowa, Des Moies** — MAGAZINE — Cowles Magazines, Inc., 3815 Cottage Grove, Look Magazine Bldg. $1,000,000.

▲ **Iowa, Waterloo** — SCHOOL — Catholic Parishes of Waterloo, construct Columbus High School. $1,000,000.

▲ **Mass., North Dartmouth**—SCHOOL—Roman Catholic Archdiocese of Fall River, Most Rev. James L. Connolly, Bishop, 362 Highland Ave., Fall River, plans by Chester F. Wright, 681 Main St., Waltham, Regional Catholic High School, Slocum Rd. $2,000,000. CD 2/25.

▲ **Minn., Wabasha**—HOSPITAL—St. Elizabeth Hospital, plans by M. F. Pfaller & Assocs., 7613 W. State St., Wauwatosa, Wis., hospital addn., remodel. $2,000,000.

▲ **Mo., Jefferson City**—OFFICE, etc.—J. Harvey Hyams, c/o 7818 Forayth Blvd., Clayton, plans by Paul Klingensmith & Assocs., 4232 West Pine Blvd., St. Louis, Zone 8, 12 story office bldg., and garage on Madison Ave., adjacent to East Capitol Ave., incl. 44,212 sq. ft. office space and parking facilities for 225 cars, etc. $1,500,000.

▲ **O., Canton**—HOMES—Joseph A. Sigler, Fulton Rd. Shopping Center, Canton, 86 ranch-type brick homes, 28-acre site near St. Michael's Blvd. and Wise Rd. $1,750,000.

▲ **O., Munroe Falls**—HOMES—Charles Neale, Tallmadge, 140 homes on 80-acre site on S. Main St. south of S. River Rd., streets, sewers and utilities. $2,000,000. Constr. this fall.

▲ **O., Munroe Falls**—HOMES—John Renner, Munroe Falls Park, Munroe Falls, 300 homes in area around the park. $2,000,000. Work to start in 1958.

▲ **O., Parma**—HOSPITAL—Catholic Diocese of Cleveland, 1027 Superior Ave., Cleveland, Zone 14, Cancer Hospital. $1,200,000. George S. Rider, Terminal Tower, Cleveland, Zone 13, consult. engr. Bids about middle of October. CD 3/31/50.

▲ **O., Toledo**—SHOPPING CENTER—Don M. Casto & Assocs., 42 S. Fourth St., Columbus, shopping center, 40-acre site, Bryne Rd. and Glendale Ave. $2,000,000.

▲ **Pa., Elkins Park**—RELIGIOUS, etc.—Adeth Jeshurum, Ansley and Old York Rds., Melrose Park, plans by Demchick & Supowitz, 246 S. 15 St., Phila., religious and educational center, $2,000,000. Dorfman & Bloom, 1411 Walnut St., Phila., engrs.

▲ **Tex., Arlington**—BOWLING ALLEY—Great Southwest Bowling Lanes, c/o B. J. Thompson, pres., 401 Wynnewood Village, Dallas, constr. 32 lane bowling alley, Fort Worth-Dallas Turnpike and Hy. 360. $1,000,000.

▲ **Tex., Dallas**—HOME FURNISHING MART—Trammell Crow, 425 S. Field St., constr. 2nd unit of Home-furnishings Mart, 2000 Stemmons Expressway, near Love Field. $2,250,000. Bids in summer.

▲ **Tex., Houston**—HOSPITAL—Texas Institute for rehabilitation & Research, c/o Texas Medical Center,

Lamar Fleming, Jr., 1133 M. D. Anderson Blvd., hospital, located in and affiliated with Texas Medical Center, $1,350,000.

▲ Wash., Renton—SHOPPING CENTER—A. B. Allper & Assocs., 1731 31 Ave. S., Seattle, enlarge and recondition Highlands Shopping Center. $1,000,000. Work may start this year.

▲ Wis., Wauwatosa—SCHOOL—Wis. Lutheran High School Conference, 1859 N. 13 St., Milwaukee, plans by Grellinger & Rose, 757 N. Broadway, Milwaukee, Zone 2, Lutheran High School. $2,000,000.

INDUSTRIAL BUILDINGS

▲ Calif., Concord—FACTORY—Standard Register Co., 626 Albany St., Dayton, O., 1 story, ultra-modern, factory to make business forms, on 18-acre site. $1,000,000.

▲ Conn., Norwalk—PLANT—Connecticut Light & Power Co., Selden St., Berlin, generating plant, incl. 150,000 kw turbo generator, Manresa Island. $25,000,000. CD 7/5/55.

▲ Mich., Detroit—PARKING FACILITY—Great Lake Greyhound Lines, 2301 West Lafayett St., Detroit, 600 car capacity, parking facility, Bates, Randolph, Larned and Congress Sts. $1,500,000.

▲ Neb., Big Springs—PLANT—Kansas-Nebraska Gas Co., Inc., Phillipsburg, Kan., natural gas plant in Big Springs field, $1,000,000. CD 4/21/54, under Unclassified.

▲ O., Louisville—PLANT—Stainless Steel Div. Jones & Laughlin Steel Corp., 1610 Fisher Bldg., Detroit, Mich., plant, 140-acre site, incl. 4 buildings addns. and renovations. $16,000,000.

▲ Tex., Longview—PLANT—Sonoco Products Co., East Nelson St., new plant, Greggton, near here, $1,000,000. CD 3/16/55.

▲ Wyo., Casper — PLANT — Davison Chemical Div., W. R. Grace Co., Davison Chemical Bldg., Baltimore 3, Md., sulphuric acid plant. $2,000,000. To go ahead in August.

UNCLASSIFIED

▲ California-Oregon-Washington-British Columbia and Alberta—GAS PIPE LINE—Pacific Gas & Electric Co., 245 Market St., San Francisco, Calif., 1,300 mi. gas pipe line from California, U. S. A. to Alberta, Canada. $330,000,000. Bechtel Corp., 220 Bush St., San Francisco, Calif., consult. engrs.

▲ Calif., San Francisco—PORT FACILITIES—State Bd. Harbor Comrs., c/o Secy., Ferry Bldg., $50,000,000 bond election Nov. 5, port facilities. CD 1/28.

▲ Conn., Hartford—PARKS, etc.—City, City Hall, restoration by reconstr. Corning Fountain, Bushnell Park, $160,000; repairing Memorial arch and development of pond, Bushnell Park, $120,000. CD 11/30/50. renewal of valves on outflow, repairing of dam, replacing storage structure and cottage at Batterson Park, Farmington, $80,000; drainage system, pump house and grading, Colt's Park, $92,000; sports arena and field house, Goodwin Park, $210,000; service bldgs., Goodwin Park, $75,000; hard surf. obsolete roads in Keney Park, $180,000; reconstr. Pope Park swimming pool and neighborhood pools in Barbour St. and Mark Twain Areas, $260,000; draining, grading, surf. Pope Park, $74,000; development of Waverly Field, incl. enlargement of relocation of road, $200,000; constr. 5 mi. walks in existing parks, $110,000; reconditioning existing parks incl. fencing, conditioning soil, turf and planting, $300,000; 5 artificial ice skating rinks, $2,500,000; site development for Gaelic football, athletic track, soccer, football, cricket pitch, 4 baseball diamonds, $80,000.

▲ New Jersey—PARKING LOT, etc.—Port of New York Authority, 111 8 Ave., New York 11, N. Y., parking lot for George Washington Bridge, Lemoine and Center Aves., Main St., $400,000; Marginal St., from Lemoine Ave. to Hudson Terrace, approach to George Washington Bridge, $2,000,000.

▲ N. Y., New York—PIER ALTERATIONS, etc.—Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, Proj. D-256, Pier 92 alterations and enlargement, North River at foot of 52 St. $3,000,000. Praeger-Kavanagh-Waterbury, 126 E. 38 St., Zone 16, engrs. CD 5/28.

▲ North Carolina—RURAL DISTRIBUTION LINES—Davie Electric Membership Corp., Hocksville, 55 mi. rural distr. lines and 17 mi. 44 kv. transmission 4 new sub-stations and sys. imprvs., Davie Co. $1,035,000. CD 11/15/51.

▲ Oklahoma—GAS LINES—Cities Service Gas Co., 1st Natl. Bldg., Oklahoma City, 60 mi. gas pipe lines in Medford and Alfalfa Counties, between Medford and Burlington, areas. $1,288,600.

▲ Tex., Houston—GAS LINES—City, Natural Gas Dpt., City Hall, repairing and replacing natural gas lines where leaks are found, in natural gas distr. sys. $1,000,000. Hedrick, Stanley & Lightfoot, 5201 Fannin St., consult. engrs. CD 10/3/52.

▲ Tex., Kingsville—GAS SYSTEM—Humble Oil & Refining Co., 1216 Main St., Houston, gas and processing cycling plant, $10,000,000; field gas gathering pipe line system, $250,000; 2 or more gas pipe lines bringing gas from fields gathering system to cycling plant, $300,000, above work 15 mi. southwest of here. Work to start early in 1958.

▲ Wash., Tacoma—PARKING—City, City Hall, off-street parking facilities in downtown area. $1,500,000.

▲ Wyoming—NATURAL GAS LINE—Northern Utilities Co., Casper, 61 mi. 6- to 16-in. pipe line to link natural gas operations. $2,000,000.

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MILESTONES IN POWER PROGRESS

(NO. 1 IN A SERIES)

1885 — The first internal-combustion engine car — by Benz

1955—The first creative-packaging of dry-charged batteries was introduced by GLOBE

Historians disagree on the absolute birthday of modern motoring, but Karl Benz did build the first internal-combustion engine car. And there's no argument at all about Globe's *battery* contributions . . . not only pioneering dry-charged batteries, but first to package all elements *together* for the simplest, swiftest battery activation ever known.

It's this fast, this easy, this important . .

Open the compact carton, a complete package of charging ingredients • Take out each plastic bottle of *pre-measured* Spinning Power electrolyte — no waste, no guesswork, no time out to measure • For extra safety slip each bottle into the handy pouring sleeve • Your grip is firm as you snip the bottle nipple and — *Pour!* Battery is *ready for action* with *fresh power*. Because until that instant the battery has been inert — and because *method and ingredients are all together in one package.*

Another milestone in power — another ***first*** for Globe!

First for fast, low-cost delivery too!

Lightweight plastic electrolyte bottles and compact carton cut shipping costs. Furthermore, Globe's sixteen plants are strategically located for fastest, lowest-cost shipments to all markets — and thirteen (*) are producing dry-charged batteries.

*ATLANTA, GA., *DALLAS, TEXAS, *EMPORIA, KANSAS, *HOUSTON, TEXAS, *LOUISVILLE, KY., *MEDFORD, MASS., *MEMPHIS, TENN., *MILWAUKEE, WIS., *MINERAL RIDGE, OHIO, *PHILADELPHIA, PA., *REIDSVILLE, NO. CAROLINA, *SAN JOSE, CALIF., *HASTINGS-ON-HUDSON, N. Y., LOS ANGELES, CALIF., OREGON CITY, ORE., AJAX (ONTARIO) CANADA

SPINNING POWER

GLOBE-UNION

SPLIT-SECOND STARTING

GLOBE-UNION INC.

MILWAUKEE 1, WISCONSIN

If it's Petroleum-powered there's a GLOBE-BUILT BATTERY right from the start!

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 13 Massachusetts August 19 Connecticut
STREETS AND ROADS
August 19 Connecticut August 23 Vermont

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 7/30,
Suburban Excavators, Inc., 4 New Salem St., Wakefield, Mass., and **Consolidated Builders, Inc.,** Draper Ave., North Attleboro, Mass., LB **$2,614,373,** est. $3,173,-702, (11 bidders), relocation of Rte. No. 28, Andover. CD 7/3.

▲ **Vermilya Brown Co., Inc.,** 100 E. 42nd St., New York, N. Y., CA **$2,669,000** (2 bidders) enlarging, modernizing HOSPITAL, TORRINGTON, CONN. Charlotte Hungerford Hospital, Litchfield St., Torrington, Conn. Bids June 27. CD 8/1, under LB.

BUILDINGS—LB & CA

▲ **Town, Town Hall,** Bristol, Conn., rejected bids June 28, HIGH SCHOOL addn., BRISTOL, CONN., LB **$3,557,000.** CD 7/9 under LB.

▲ **Vermilya Brown Co.,** 100 E. 42 St., New York, N. Y., LB **$2,669,000,** est. $500,000, enlarging, modernizing HOSPITAL, TORRINGTON, CONN. Charlotte Hungerford Hospital, Litchfield St., Torrington, Conn. Bids June 27. CD 6/17.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 29 New York
STREETS AND ROADS
August 14 Delaware August 15 New Jersey
August 29 New York

BUILDINGS—BA

▲ **N. J., Mahwah**—SCHOOL—BA About 8/10—Bd. Educ., Malcolm Rd., high school, $3,250,000. Target for completion Sept. 1958. Warren H. Ashley, 967 Farmington Ave., W. Hartford, Conn., archt. CD 10/9.

▲ **N. J., Somerville**—SCHOOL—BA 9/12—Bd. Educ., Twp. of Bridgewater, high school. $3,000,000. Alexander Merchant Assocs., 1 Elm Row, New Brunswick, archts. CD 3/5.

HEAVY CONSTRUCTION—LB & CA

▲ **Baldwin-Lima Hamilton Corp & Newport News Shipping & Drydock Co.,** Phila. National Bank Bldg., Phila., Pa., LB **$20,415,600,** award contingent on Congress permitting construction, Contr. NP-3, Spec. PA-N-24002, furnishing, del. 200,000 hp. hydraulic turbines for Lewiston Power Plant, Niagara Power Proj., NEW YORK. The Power Authority of State of New York, The Coliseum, 10 Columbus Circle, New York 19, N. Y. Bids July 15 (**correction**—Low Bidder). CD 7/17, under LB.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 7/30,
Union Bldg. & Constr. Corp., 631 Main Ave., Passaic, N. J., LB **$4,949,987** (6 bidders), grading, paving and bridges 2.434 mi. Rte. 101, Sect. 2A, from Mount Hope-Rockaway Rd. to U. S. Rte. 46 in Rockaway and Denville Twps. and Rockaway Borough. CD 7/19.

BUILDINGS—LB & CA

▲ **Turner Constr. Co.,** 1500 Walnut St., Phila. Pa., CA Est. **$5,000,000.** OFFICE BLDG., Western and Willard Aves., BETHESDA, MD. Government Employees Insurance Co., 14th and L St. N.W., Wash., D. C. Vincent G. Kling, 917 Corinthian Ave., Phila. 30, Pa. CD 4/7/55.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ **GEORGIA**—State Hy. Dpt., No. 2 Capitol Sq., Atlanta, Bids opened 7/26,
Ga.—**Mose Gordon Lumber Co.,** Commerce, Ga., LB **$155,618,** grading, paving 5.195 mi., one bridge (Colbert-Crawford Rd., FAS Rte. 1089) beginning at end of present pavt. approx. 3 mi. north Crawford and extending north to beginning of existing pavt. FA Sec. Proj. S-1089 (2), Oglethorpe Co.; LB **$247,276,** grading, paving 3.256 mi., one bridge (Eatonton-Greensboro Rd., State Rte. 44), beginning at point approx. 1,300 ft. southwest of Oconee River and extending northeasterly partly on relocation to beginning of existing pavt. approx. 7.5 mi. south of Greensboro, FA Sec. Proj. S-0783 (2), Putnam and Greene Counties;
Ga.—**Reeves Constr. Co.,** Box 473, Americus, Ga., LB **$112,552,** grading, paving 5.722 mi., one bridge (Americus-State Rte. 118 Rd., FAS Rte. 647) beginning at Lee Co. line and extending north to beginning present pavt., FA Sec. Proj. S-0647 (2), Sumter Co.;
Ga.—**Scott Constr. Co.,** Thomasville, Ga., LB **$2,344,-008.** grading, paving 13.947 mi. double bridge over A.C.L. Railroad and bridge over Ochloknee River on Thomasville By-Pass on Thomasville-Camilla Rd., U. S. Rte. 19, beginning at point State Rte. 35 approx. 1 mi. south of Thomasville city limits and extending north on relocation east of Thomasville to State Rte. 188 near Ochlocknee, Proj. No. F 006-1 (5) and F 007-2 (5), Thomas Co.;
Ga.—**Shepherd Constr. Co.,** 1800 Briarcliff Rd. N.E., Atlanta, Ga., LB **$602,113,** grading, paving 13.735 mi., one bridge (Metter-Millen Rd.) beginning at State Rte. 26, U. S. Rte. 80, at intersection of paved post road 11 mi. north of Metter and extending north to intersection with State Rte. 67, U. S. Rte. 25, approx. 6 mi. south of Millen, FA Proj. F 097-1 (1), Emanuel and Jenkins Counties;
Ga.—**G. A. Garrett Constr. Co.,** Box 3013, Albany, Ga., LB **$287,251,** grading, paving 9.686 mi., one bridge (Valdosta-Howell Rd., FAS Rte. 568) beginning at State Rte. 94 approx. 400 ft. east of Ulmer Ave. near Valdosta city limits and extending east to beginning of existing pavt., FA Sec. Proj. S-0568 (2), Lowndes and Echols Counties;
Ga.—**R. G. Foster & Co.,** Drawer 8, Wadley, Ga., LB **$87,063,** grading, paving 3.905 mi. (Washington-State Rte. 79 Rd., State Rte. 44) beginning at end of present pavt. near east city limit of Danburg and extending northeast to State Rte. 79, FA Proj. S-0965 (3), Wilkes and Lincoln Counies; LB **$273,722,** grading, paving 3.516 mi. (Nahunta-Jesup Rd., State Rte. 23) beginning approx. 5 mi. north Nahunta and extending north along new alignment parallel to present paved road. FA Proj. F-085-1 (5) Ct. 2, Brantley Co.; LB **$631,627,** wid'n., reconstr. and resurf. 9.521 mi.; widening one bridge; constr. 2 bridges (Waynesboro-Augusta Rd., State Rte. 21) beginning near north city limit Waynesboro and extending north to point approx. 741 ft. north Burke-Richmond Co. line, FA Proj. F-015-1 (1), Burke and Richmond Counties;
Ga.—**C. A. Rutledge Constr. Co.,** Winder, Ga., LB **$150,-625,** grading, paving 6.797 mi. (Ila-Royston Rd., State Rte. 174) beginning at intersection with State Rte. 106 approx. 1 mi. north of Ila and extending northeast to State Rte. 8, FA Sec. Proj. S-1265 (1), Madison Co.;
Ga.—**C. W. Matthews Contr. Co.,** 119 Alexander St., Marietta, Ga., LB **$749,459,** wid'n., reconstr., resurf., 10.863 mi. (Cedartown-Rockmart Rd., State Rte. 6, U. S. Rte. 278) beginning at Martell Street in Cedartown and extending east to beginning of curb and gutter section in Rockmart, FA Proj. F-020-1 (5), Polk Co. CD 7/18.

BUILDINGS—LB & CA

▲ **M. T. Broy Hill & Sons Corp.,** 4610 Lee Hy., Arlington, Va. Owner Builds. **$5,000,000,** 250 HOMES, Chain Bridge Rd. and Old Dominion Dr., McLEAN, VA.

▲ **Stone & Webster Eng. Co.,** 49 Federal St., Boston, Mass., CA Est. **$20,000,000** design and constr. BREWERY at Old Henderson Air Field, TAMPA, FLA. Joseph Schlitz Brewing Co., 235 W. Galena St., Milwaukee, Wis. CD 2/6.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 14 Michigan August 20 Wisconsin
STREETS AND ROADS
August 13, 20 Indiana August 14, 21 Michigan
August 20 Ohio, Wisconsin

▲ **Ill., Chicago**—BA 8/19—City, City Hall, N.W. Superhighway, fabricating, erecting structural steel grade separation, carrying C. & N.W. R.R., W. Hubbard and N. Green Sts. over superhighway. $6,000,000. CD 10/25, under Streets and Roads.

BUILDINGS—BA

▲ **Ill., Franklin Park**—SCHOOL—BA 10/3—School Dist. 12, 320,000 sq. ft. West Leyden High School with swimming pool and fieldhouse, 34 acre site, Grand Ave. and Wolf Rd. $6,000,000. Sobel & Stein, 450 E. Ohio St., Chicago, archts. CD 6/22/56.

HEAVY CONSTRUCTION—LB & CA

▲ **Sharman, Allen Gay & Taylor,** Bayou Bldg., Houston, Tex., CA Est. **$13,000,000;** 112 mi. gas Transmission line from Brush Control Station near West Richfield in Summit Co. to Sarahsville in Noble Co. where it will join Texas Eastern Transmission line, OHIO. East Ohio Gas Co., 1405 E. 6th St., Cleveland, O. CD 2/13.

▲ **A. Bentley & Sons Co.,** 201 Belmont Ave., Toledo, O., CA **$3,342,855.** Sect. 1, general constr., major equip. and processing piping and Sect. II, electrical work for sewage treatment plant imprvs., TOLEDO, O. City, H. G. Rebensal, comr. Purchases, Safety Bldg., Toledo, O. Bids May 28, awarded July 19. CD 6/4, under LB.

BUILDINGS—LB & CA

▲ **Kucirek Constr. Co., Inc.,** 2904 Oberlin Ave., Lorian, O., Owner Builds. **$2,500,000.** 127 HOMES, off Oberlin Ave. between 37th and 38th Sts., LORAIN, O.

▲ **Warren Eng. Co.,** Warren, O., CA Est. **$10,000,000,** 540 HOMES, incl. 18 apartment bldgs. on 60 acre site between Austin Village Shopping Center in W. Market St. and Trumbull Shopping Plaza in Parkman Rd., WARREN, O. Walter Graham, pres. Warren Development Corp., Warren, O. CD 1/30.

▲ **La Mar Home Builders,** c/o Owner, Rose Hill Co., agt., 17300 Grand River, Detroit, Mich., CA Est. **$7,800,-000,** 500 brick HOUSES, Twin Lake Village Development, 8 mi. west of Pontiac between Pontiac and Oxbow Lakes, PONTIAC, MICH.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
August 13 Colorado August 15 Kansas

BUILDINGS—BA

▲† **Tex., El Paso**—HOUSING—BA 8/23—U. S. Eng., Box 1538, Albuquerque, N. M., 490 unit Capehart Housing, incl. utilities, ENG-29-055-58-12. $5,000,-000-$10,000,000. Extended date. CD 7/11.

BUILDINGS—LB & CA

▲† **Williams & Dunlap,** 7722 Eastern St., Dallas, Tex., CA **$6,435,600,** brick veneer, concrete 460 housing UNITS, Webb Air Force Base, ENG-41-369-57-24, BIG SPRING, TEX. Procurement Officer, Webb Air Force Base, Big Spring, Tex. Bids June 2. CD 7/9, under LB.

▲ **Procon, Inc.,** c/o The Gulf Oil Corp., owner, 7 St. Rd., Port Arthur, Tex., CA Est. **$5,500,000,** benzine mfg. PLANT (30,000,000 gal. annual capacity to make benzine from petroleum by-products) PORT ARTHUR, TEX. CD 8/7/56.

▲ **Leonard Constr. Co.,** 37 S. Wabash Ave., Chicago, Ill., CA **$2,000,000,** SULPHURIC ACID PLANT, CASPER, WYO. Davison Chemical Div., W. R. Grace Co., Davison Chemical Bldg., Baltimore, Md. CD 7/25.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 21 California
STREETS AND ROADS
August 21 California

▲† **WASHINGTON**—BA 8/16—Bureau P. Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore.,
440 ft. prestressed concrete or welded steel plate girder bridge with 295 ft. approach spans over Nisqually River between Longmire and Paradise Inn, Mt. Rainier National Park. B. M. French, regional engr. CD 12/28/55.

HEAVY CONSTRUCTION—LB & CA

▲† **M. M. Sundt Constr. Co.,** 440 South Park Ave., Tucson, Ariz., CA **$2,541,152,** National Guard Facilities, Tucson Municipal Airport, ENG-04-353-57-107, TUCSON, ARIZ. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids June 13. CD 6/17, under LB.

BUILDINGS—LB & CA

▲ **Beyer & Abrahamson,** Suite 319, 9th and Hill Sts., Los Angeles, Calif., CA **$2,000,000.** 5 story, rein.-con., steel OFFICE BLDG., 280 S. Locust St., POMONA, CALIF. General Telephone Co., 134 Holt Ave., Pomona, Calif. Maurice Sasso, Tishman Bldg., 4th and Spring Sts., Los Angeles, Calif.

▲ **Kemp Bros. & George Thompson,** 8750 Mettler St., Los Angeles, Calif., CA **$2,712,000,** Westside HIGH SCHOOL, POMONA, CALIF. Pomona Unified School Dist., 605 N. Park Ave., Pomona, Calif. Bids July 23, awarded July 26. CD 7/26, under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
August 14 Ontario

BUILDINGS—SLC

▲ **Que., Montreal**—STORE—The Eaton Co., Ltd., 677 St. Catherine St. W., soon lets contract 300,000 addnl. sq. ft. store space, store exten. (to give store full 9 story height) rein.-con. fdn., $2,000,000. Grattan D. Thompson, 1241 Guy St., archt. Bids Feb. 26 cancelled. CD 2/13.

HEAVY CONSTRUCTION—LB & CA

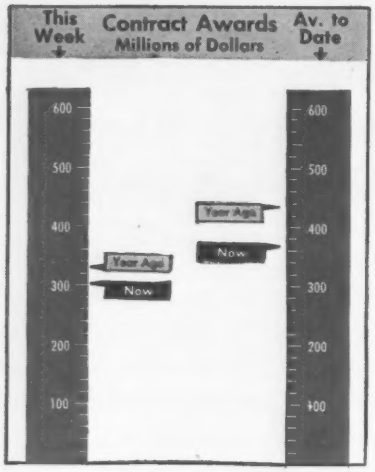
▲ **City,** City Hall, Edmonton, Alta., Owner Builds. **$4,183,882,** constr. about 23,000 ft. 60- to 108-in. rein.-con. sewer of which about 1,500 ft. will be open cut and balance in tunnel up to 120 ft. in depth, Proj. A and B., EDMONTON, ALTA. CD 6/27, under LB.

▲ **Dpt. Transport,** Hunter Bldg., Ottawa, Ont., cancelled bids to have been opened May 20, bit. RUNWAY, 6,000 ft. x 200 ft. Norman Wells Airport, NORMAN WELLS, NORTHWEST TERRITORIES. LB Est. **$4,918,016.** CD 6/17, under LB.

(Proposal Advertisements see pp. 116 to 118)

Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 32 wks 1957 millions	Chge '56-'57 %
Federal	$23.2	$1,710.6	+51
State and Municipal	127.7	4,619.9	+15
Total Public	150.9	6,330.5	+23
Total Private	147.4	5,403.4	−38
U. S. Total	$298.3	$11,733.9	−15
By Type of Work			
Waterworks	$7.2	$229.6	+0.6
Sewerage	12.8	354.1	−4
Bridges	14.3	463.5	+22
Highways	59.5	1,976.9	+31
Earthwork, Waterways	3.6	678.2	+41
Buildings:			
Public, Excl. Housg.	27.8	1,413.3	+12
Public Housing	8.9	431.9	+100
Private Housing	53.1	1,906.3	−47
Commercial	35.6	1,122.3	−2
Industrial	43.1	2,063.8	−42
Unclassified	32.4	1,094.0	−3
U. S. Total	$298.3	$11,733.9	−15

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

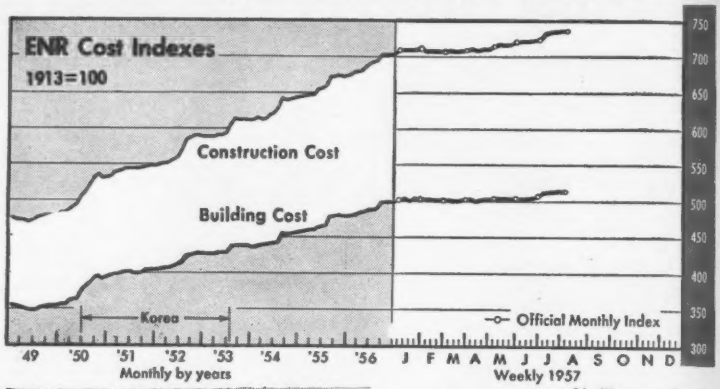
	Week of Aug. 1	Cum. 31 wks 1957 millions	Chge '56-'57 %
Corporate Securities	$111.9	$3,630.0	+32
State and Municipal:			
All Except Housing	87.7	3,216.2	+10
Housing	...	155.8	+268
Federal Loans	3.5	154.1	+96
Federal Aid	...	2,161.2	+102
Total Nonfederal	$203.1	$9,317.2	+36
Federal Appropriations:			
In U. S.	...	$413.8	−87
Outside U. S.	...	22.8	+43
Total New Capital	$203.1	$9,753.8	−2

Cost Indexes as of Now

ENR INDEXES (1913=100), 20-cities' average	Week of Aug. 1 1957	% Change from July 4 1957	% Change from Aug. 2 1956
Construction Cost	738.63*	+0.7	+6.1
Building Cost	516.90*	+0.6	+5.2

* Official Monthly Index for August

To convert above indexes to 1926=100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949=100: Divide Construction Cost by 4.770; Building Cost by 3.518



WAGE RATES, 20-cities' average

	August 1957	% Change from July 1957	% Change from August 1956
Common	$2.333	+1.5	+6.4
Skilled (average three trades)	3.584	+1.2	+5.0
Bricklayers	3.827	+0.5	+3.8
Structural ironworkers	3.595	+1.9	+6.3
Carpenters	3.330	+1.1	+5.2
Equipment operators (average three types)	3.210*	+1.7**	+8.1

* July ** June (rev.)

MATERIAL PRICES, 20-cities' average

Structural steel (average three mills), per cwt	5.275	+5.5	+14.7
Lumber, 2x4 fir, per M fbm	116.611	+0.9	−3.0
Lumber, 2x4 pine, per M fbm	101.633	−0.2	−3.6
Cement, bulk, per bbl	3.923	0†	+5.3
Sand, per ton	2.527	+3.1	+5.2
Ready-mixed concrete, per cu yd	13.676	+0.8	+2.5
Gypsum sheathing, ½″x2′x8′, per Msf*	63.030	+0.5	+1.6
Fiber board sheathing, ½″ sq. ed, per MSF*	71,300	−1.8	+2.9
Mineral wool insulation, 3′ batts, per Msf*	70.553	−1.5	−1.6
Crushed stone, 1½″, per ton, CL	2.796	−1.2	+0.3
Concrete blocks, sand gravel, 8″x8″x16″, each*	0.227	+0.4	+1.3
	July 1957	June 1957	July 1957
Brick, common, per M	37.675	+0.4	+2.7
Lime, hydrated finishing, per ton, CL	36.299	0	+8.1
Structural clay tile, 3x12x12″, per M, 2,000 up*	179.242	+0.2	+3.3
Vitrified clay sewer pipe, std 12″, per ft	1.299	0	+5.2
Concrete sewer pipe, 12″, per ft	1.162	+0.7	+6.4

* Delivered, trucklots † July revised

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
1956	1913=100	1949=100	1913=100	1949=100	1913=100	1949=100
Aug	696.31	145.97	491.22	139.63	583	168
Sept	704.91	147.77	500.10	142.16	580	168
Oct	703.88	147.56	499.54	142.00	729	211
Nov	704.13	147.61	500.48	142.27	542	157
Dec	703.82	147.55	500.17	142.18	624	180
1956 Average	**692.37**	**145.14**	**490.76**	**139.50**	**671**	**194**
1957						
Jan	707.90	148.40	501.96	142.69	504	146
Feb	710.06	148.85	502.59	142.87	546	158
Mar	708.64	148.56	501.37	142.52	553	160
Apr	709.30	148.69	501.37	142.52	564	163
May	715.70	150.04	503.01	142.99	553	160
June	721.36	151.22	504.17	143.32	588	170
July	724.15	151.81	506.62	144.01	587	170
Aug	738.63	154.84	516.90	146.93	...	...

THOR PAVING BREAKERS

Available in 30, 60, 70, 80-lb. classes

Thor model 25 paving breakers working in tandem, speed street demolition. Easy-operating latch retainer encourages operators to use sharp steels.

THOR MUFFLES BREAKER NOISE

Now it's easy to cut down paving breaker noise in quiet zones or inside buildings by covering breakers with Thor's exclusive muffle cover. Cuts noise, reduces operator fatigue. .

Your men will complete more work with less fatigue when they use Thor Paving Breakers, because Thor's smooth performance prevents power overloads which stagger the stroke and cause vibration. Thor's exclusive tubular air valve admits only the exact amount of air required for each stroke, assuring balanced power, maximum air economy and low maintenance costs. Ask your Thor distributor for a demonstration. Thor Power Tool Company, Prudential Plaza, Chicago 1, Illinois.

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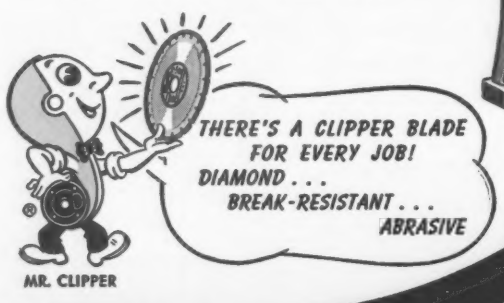
HI-LO CONTROL WHEEL
Does Everything!

YES . . . HI-LO does everything! Without turning off motor, you position Cutting Head, ready to cut any material from wall tile to concrete block —at any height—from 0" to 17".

- No levers or knobs to pull
- No slides, gears or unnecessary parts to wear out
- No down time — more production time

SUPERMATIC has over 30 outstanding features found on no other masonry saw—including the specially designed 2 H.P. G.E. motor...Heavy Duty Sta-Level Cutting Head with giant size shaft and housing and the all new conveyor cart you can't cut in two. Ask for FREE TRIAL!



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July Contract Awards Top June by 2%

Heavy construction contracts, as reported by ENGINEERING NEWS-RECORD and CONSTRUCTION DAILY, totaled $1.58 billion in July. The monthly figure was 2% above June despite a 13% drop in private work to $637 million and a 1% decline in state and municipal awards. Federal contracts carried the ball with an 89% increase.

Road work was a leader for the month with $311 million of new highway contracts placed under contract. This is a 6% jump over June and a fat 43% increase over July 1956.

Among the top highway awards was a $37.7 million contract for work on the Illinois Toll Road. New York, Ohio and California also helped the highway classification with awards ranging from $20 million to $36 million.

The road classification in a continued uptrend saw awards running at an average weekly rate of $77.7 million compared to June's $73.3 million weekly average.

For the first seven months this year, the volume of highway awards is exceeded only by industrial building.

• **One up, one down**—Despite a 44% drop from last year's comparable seven months, industrial building topped all other types of construction with awards of $1.95 billion. Highway awards of $1.83 billion top last year's figure by 31%.

The public works category was generally on the healthy side. Only waterworks and bridges showed a minus sign in July when compared with the previous month. They were down 21% and 22% respectively.

Most types of public works showed increases over July of last year ranging from 26% to 114%. Unclassified was the only public works category to show a drop from July 1956, and that was only 5%.

Public building other than housing turned up awards of $1.34 billion for the first seven months. This is an increase of 12% over last year's comparable period and can be accounted for by a rash of school construction programs under way.

The July total for public buildings was swelled by a $35.5 million State Department building in Washington, D. C. and a $13.2 million hospital at the Great Lakes Naval Training Center in Illinois.

• **The private picture**—Mass housing led all other private construction dollar volume ($227.4 million), but the total still represented a drop of 18% from June and a 30% decline from July 1956.

Of the total housing awards, Ohio claimed 30% in July with two mass housing projects at Reynoldsburg totaling $27 million and two awards at Parma tallying $22.5 million.

Ohio also walked off with the crown in the industrial building classification, accounting for $70.9 million of the nation's $213 million in contracts awarded during July.

• **Commercial activity**—Awards for commercial building during July rose to $158 million, topping June by 16% and July 1956 by 37%. However, its awards of more than $1 billion so far this year still are below last year's comparable period by 3%.

Two contracts in New York City helped boost the July total; one of $25 million for a 38 story structure in the financial district and another of $10 million for an office building.

Ohio, for the second consecutive month, topped all states in construction contract awards, as reported by ENR and CD. New York ranked second among the 23 states that let more contracts in July 1957 than a year ago. Its $145 million of awards soared 129% ahead of July 1956, while in commercial contracts the state topped all states for the month.

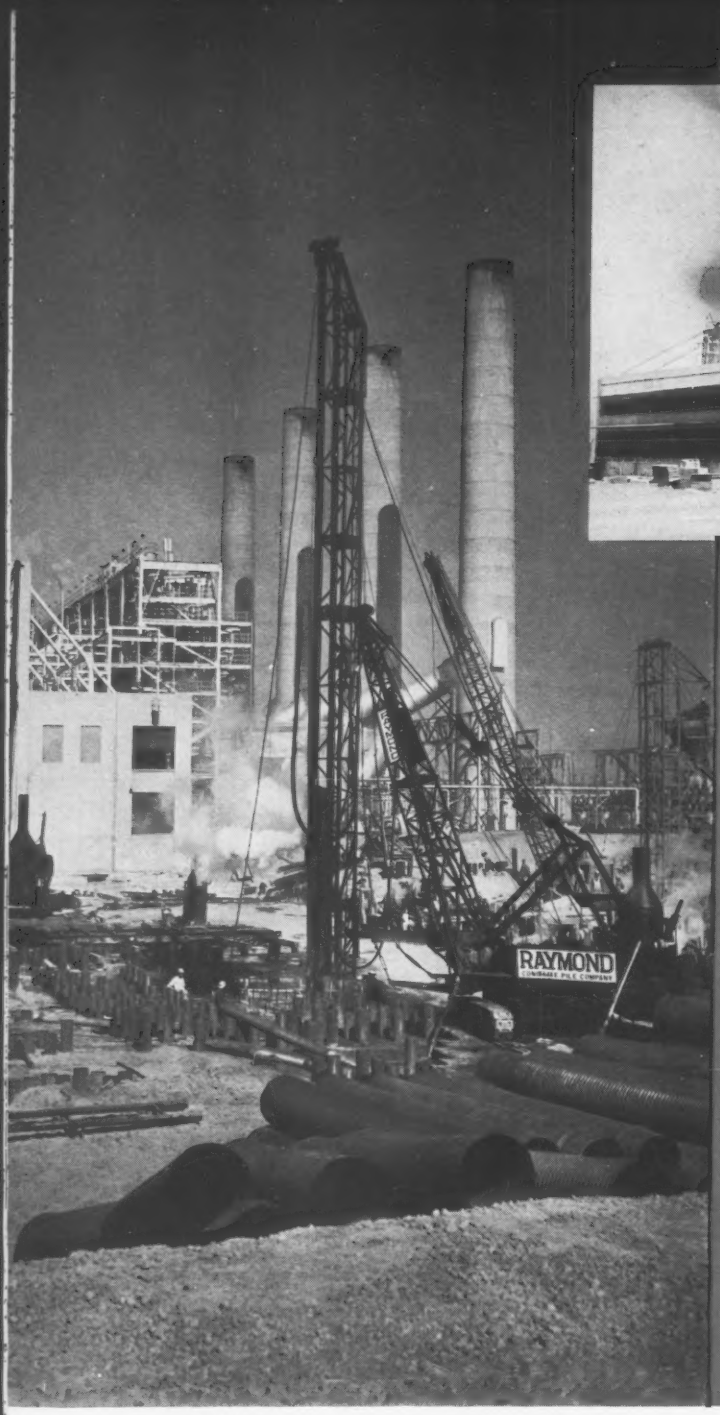
(*B&F continued on page* 104)

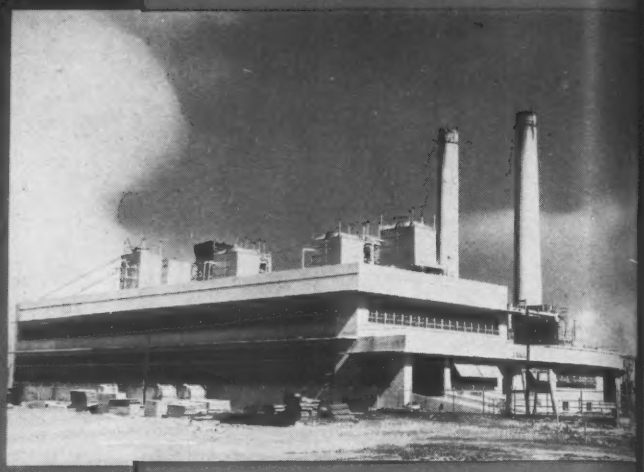
Engineering Construction Contracts—July '57

ENGINEERING NEWS-RECORD *reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation,* $44,000; *other public works,* $73,000; *industrial buildings,* $93,000; *other buildings,* $344,000.

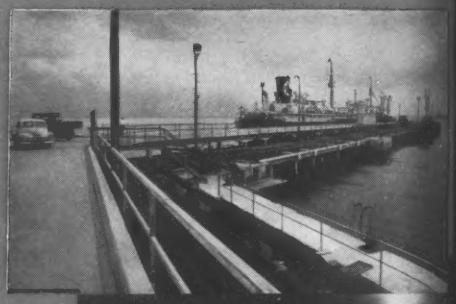
Four Weeks Thousands of Dollars (000 Omitted)

	July, 1957							U. S. Cumulative Seven Months		% Chance	Canada July
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U. S.	1957	1956	'56 to '57	1957
Public Works											
Waterworks	444	1,800	1,787	2,735	6,930	2,422	16,118	216,903	215,858	+0.5	1,169
Sewerage	3,504	20,831	5,845	20,804	8,269	16,727	75,980	334,455	346,249	− 3	3,429
Bridges	4,585	19,039	12,607	12,012	12,984	4,793	66,020	432,347	355,426	+22	3,821
Earthwork and waterways	9,382	985	2,388	19,459	11,007	32,902	76,123	665,589	465,839	+43	8,331
Streets and roads	9,122	64,684	40,985	101,018	60,504	34,741	311,054	1,832,583	1,401,127	+31	19,921
Public buildings, residential	5,232	24,883	8,203	7,518	7,952	4,805	58,593	412,639	213,293	+93	1,000
Other public buildings	9,559	67,982	17,769	52,278	44,651	41,883	234,122	1,339,689	1,200,711	+12	18,330
Unclassified	9,222	31,327	21,500	10,665	23,828	17,303	113,845	750,624	702,976	+ 7	3,101
Total public	**51,050**	**231,531**	**111,084**	**226,489**	**176,125**	**155,576**	**951,855**	**5,984,829**	**4,901,479**	**+22**	**59,102**
Federal government (included in above classifications)	18,010	80,395	33,324	41,553	44,077	57,086	274,445	1,656,335	1,106,295	+50	18,853
Private											
Bridges	.....	.....	.....	450	.....	.....	450	1,777	4,404	−60	.....
Industrial buildings	8,122	18,161	8,505	123,225	48,542	6,026	212,581	1,945,900	3,479,263	−44	38,631
Mass housing	21,462	66,352	7,099	107,288	17,982	7,187	227,370	1,790,006	3,343,444	−46	9,198
Commercial buildings	15,014	55,849	9,459	25,767	31,564	20,468	158,121	1,040,761	1,076,608	− 3	6,708
Unclassified	744	.....	2,610	1,635	18,127	15,580	38,696	271,344	393,533	−31	6,260
Total private	**45,342**	**140,362**	**27,673**	**258,365**	**116,215**	**49,261**	**637,218**	**5,049,788**	**8,297,252**	**−39**	**60,797**
Total Engineering Construction:											
July, 1957 — 4 weeks	**96,392**	**371,893**	**138,757**	**484,854**	**292,340**	**204,837**	**1,589,073**	.....	.....	.....	119,899
June, 1957 — 4 weeks	115,662	299,383	147,942	501,754	272,925	223,701	1,561,367	.....	.....	.....	124,944
July, 1956 — 4 weeks	105,933	235,825	339,378	491,077	400,927	262,278	1,835,418	.....	.....	.....	302,643
Seven Months — 1957	**719,209**	**2,683,468**	**1,206,447**	**2,530,739**	**2,026,167**	**1,868,587**	.....	**11,034,617**	.....	**−16**	**989,868**
Seven Months — 1956	751,270	3,372,200	1,488,492	2,834,685	2,814,903	1,937,181	.....	.....	13,198,731	.....	1,380,354
% Change '56 to '57	−4	−20	−19	−11	−28	−4	.....	.....	.....	.....	−28





POWER PLANTS Raymond installed the foundations for the power plant at the left in California while the power plant above, located in Puerto Rico, was completely constructed by Raymond.



OIL Tanker pier in Australia (above) is another example of Raymond's complete construction services outside the United States. Typical of foundation work in this country is the Raymond supported refinery (bottom) in Toledo, Ohio.

Raymond

THE COMPANY THAT LEADS A DOUBLE LIFE

FOR 60 YEARS, we have been recognized as one of the country's leaders in foundation work. While it's true we have completed more than 30,000 foundation and soil investigation contracts for important industrial and civic structures during this time, this represents only one part of our large scope of activities. In this country we also handle marine and heavy construction as well.

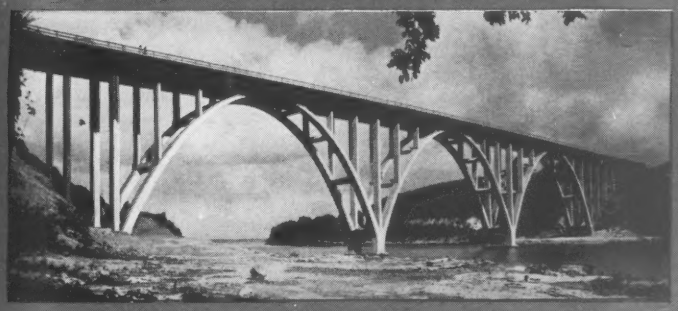
And abroad, Raymond provides a *complete* service for every type of general construction . . . from engineering studies and planning to the actual building of dams, power plants, oil refineries, housing, highways and hospitals.

This all began when we, as a pioneer in foreign construction work,

HIGHWAYS Our foundation experience plays an important part in the country's mushrooming highway program as evidenced by the work on the New Jersey Turnpike (right). In South America (below), Raymond engineers are playing a major role in Columbia's new network of highways.

BUILDINGS Above is a Raymond-built hospital in Venezuela while the bank building in Atlanta, Ga. is supported by our foundations—both excellent examples of Raymond's diversified activities.

RAYMOND
specializes in foundation installations at home . . . and general construction abroad.



BRIDGES Cuban bridge (above left) is an outstanding example of Raymond's complete construction services abroad. The Lake Pontchartrain Bridge (above right), world's longest over water bridge, rests on Raymond Concrete Cylinder Piles.

discovered it was necessary to enlarge our engineering and construction facilities to meet increasing client requirements. The more we expanded, the more services were needed, until today, we have completed over 1275 general construction projects abroad.

We cordially invite both governments and private industry to let us apply our skills for foundation, marine or heavy construction work here in the United States, or any type of general construction abroad.

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Costs Set Record

Construction Cost Index takes biggest jump since 1947 as steel prices soar

Construction costs in August leaped 14.48 points from July on ENGINEERING NEWS-RECORD's Construction Cost Index. It was the biggest such jump since January 1947.

ENR's Building Cost Index also soared from July to August with a jump of 10.28 points, the biggest point increase for this index since August 1955.

The new Construction Cost Index value is 738.63; the new Building Cost Index reading is 516.90. (Both indexes are based on 1913=100).

In making the jumps, both indexes went past the standings predicted for December of this year when ENR said the Construction Cost Index would read 728 and the Building Cost Index 513 (Dec. 6, 1956, p. 89).

Costs moved up sharply this month because of higher mill prices for structural steel shapes. Steel alone accounted for 6.9 points of the Construction Cost and Building Cost Indexes climb.

Wage increases also added to the cost rise. Common labor rate increases, including fringes pushed up the 20 city average for building and heavy construction 3.5 cents to $2.334 an hour on Aug. 1. This added 7 points to the Construction Cost Index.

• **Skilled trades gain**—The 20 city average for the three key skilled trades—bricklayers, carpenters and structural ironworkers—moved up 4.1 cents, including fringes, to $3.584 an hour to add nearly three points to the Building Cost Index.

Cement and lumber prices average about the same this month as July. The Douglas fir-southern pine 2x4's price average went up only a whisker for the second consecutive month and had no significant effect on the ENR cost indexes.

In the general labor picture, this year's contracts contain more generous fringe benefits in addition to the basic pay rate increases. Some of the fringes represent innovations for certain unions in the 20 major cities checked by ENR.

• **Big winners**—Common labor rates showed the greatest increase. Laborers on building construction have won raises, including fringes, averaging 13.5 cents an hour so far this year compared to gains of 10.9 cents last year.

Heavy construction laborers averaged pay increases of 13.8 cents an hour this year as against last year's average of 10 cents.

Carpenters and structural ironworkers this year almost surpassed 1956 gains in the 20 cities, while bricklayers, on average, settled for slightly smaller increases than those of last year.

• **What they got**—Carpenters' wage hikes this year, including fringes, average 14.5 cents, compared to 13.1 cents last year. Ironworkers came in with an average of 20.1 cents hourly this year contrasted to 15.1 cents last year.

Bricklayers, however, have obtained average increases this year of only 15.6 cents as against an 18.1 cent hourly boost in 1956.

New Lease on Life

California provides money for water planning staff

California's Division of Design and Construction in the State Department of Water Resources was granted longer life with the signing of a bill by Gov. Goodwin J. Knight appropriating $1.3 million for an aqueduct north of San Francisco.

The funds will be used to complete engineering studies and preparation of plans and specifications for the North Bay Aqueduct that will carry water from the Sacramento-Joaquin delta to the counties north of San Francisco Bay.

The appropriation, combined with about $1.7 million of holdover funds in the Water Resources Department, will make it possible to retain the engineering staff. Without the appropriation, many engineers recruited for state water planning and construction would have been dismissed (ENR June 20, p. 24).

• **Record established**—With the bill signing period now ended, Gov. Knight established a new record in accepting 2,424 bills. He vetoed 23 and pocket vetoed 222 others.

Another money bill signed was one appropriating $200,000 for surveys, plans and studies preliminary to issuance of bonds for San Mateo-Hayward Toll Bridge improvements or the construction of a parallel crossing.

Effective immediately is a new law providing funds for removal of rails and the converting of San Francisco-Oakland Bay Bridge to full motor vehicle traffic. The second deck so provided will permit one way traffic in each direction.

It also provides that if the proposed Southern Crossing is not financed by July 1, 1958, the authorization expires. The Toll Bridge Authority then may choose any site for a bridge and finance it.

• **Lease-purchase law**—Also signed into law was a bill permitting school districts to make lease-purchase agreements for school construction. The law, effective Sept. 11, limits the agreements to 40 years.

Another bill signed gives county supervisors authority to issue bonds, having a maximum term of 10 years, for construction of county roads. The bonds will be secured and payable from one-fourth the minimum amount which the state controller estimates will be paid to the county for road construction during the period the bonds are outstanding.

Similar authority also is granted to cities for street construction, but their issues must be approved by four-fifths of the City Council.

Individual issues will not require a referendum, but the entire act must be validated by a constitutional amendment to be voted on in November 1958.

At least one law will affect contractors. It provides that any person found guilty of acting as a contractor without the required contractor's license will be denied the right to a licensing examination for six months after conviction. The registrar of contracts, however, has the authority to waive this prohibition for "good cause."

• **Other laws**—Also signed were bills to:

• Increase maximum weekly unemployment insurance benefits from $33 to $40.

• Increase the appropriation for repair of storm damage to county roads from $369,000 to $500,000 a year.

Tennessee Cities Agree To Aid State on Road Land

Tennessee's four metropolitan cities have agreed to obtain titles, make appraisals and provide legal services for acquiring property within their boundaries for the interstate highway system, in return for state help in these matters.

The agreement was reached in a conference between officials of the cities and W. M. Leech, state highway commissioner. Under state law (ENR Dec. 27, 1956, p. 20), the highway department must depend on local governments for highway land acquisition.

The state and federal governments will provide the money for the purchase of the right-of-ways as well as some other work-connected costs.

(*B&F continued on page 106*)

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Negotiated Contract Upheld

Baltimore court rules that contract for state office building may be awarded without competitive bidding

A court in Baltimore, Md., has ruled that public works contracts may be let without competitive bidding unless a controlling statute, ordinance, charter or constitution requires otherwise.

The decision, written by Judge Edwin Harlan of the Circuit Court of Baltimore City, upheld the validity of a contract award for a $12.9 million Maryland state office building project to Blake Construction Company, a Delaware corporation and low bidder on the project. Terminal Construction Corporation of New Jersey and Baltimore Contractors Inc., which had jointly submitted the second low bid, had attempted to have the contract set aside on several grounds, the principal one being that the Board of Public Works had negotiated changes in the specifications and contract price with Blake after the bids were opened and before a contract was awarded.

In overruling the Terminal-Baltimore contention, Judge Harlan held that the original solicitation of bids, which was not required by law, did not waive the board's right to award the contract by negotiation rather than by bidding as long as the board's action was not fraudulent, collusive or arbitrary. Judge Harlan found no evidence of such conduct.

• **Genesis**—The case, which has evoked considerable controversy for several months (ENR Mar. 28, p. 112), involved contracts for a 15 story main office building and a 6 story State Roads Commission building. Contractors were invited to submit separate bids on the project as a whole and on the main office building alone; 20 alternates (such as substitution of limestone for marble and granux for granite) were included as possible additions to or deductions from the base bids. Blake was low by $320,000 on the two bids and was also lowest on the combination of acceptable alternates.

Low bid for the project exceeded the state's available appropriation then on hand. Through changes in the plans negotiated with Blake and through the use of alternates, the estimated cost of the two units was cut to $12,938,093. Blake's initial bid was $12,982,000.

Pending legislative action on a request for additional money, the board awarded Blake a contract for the main office building only, with a short-term option to extend the contract to the entire project exercisable by the state after the governor had signed an appropriation bill. After the bill was signed but before its effective date, the option was used and a contract was awarded for both units.

• **Questions**—In addition to the vital question of the board's right to negotiate with Blake, Terminal-Baltimore contested several actions of the board, including these: permitting Blake to correct a clerical error in its bid; imposing an ambiguous requirement for naming subcontractors; failure to reject all bids because all exceeded the existing appropriation; awarding a contract with an option and exercising the option before necessary funds were available.

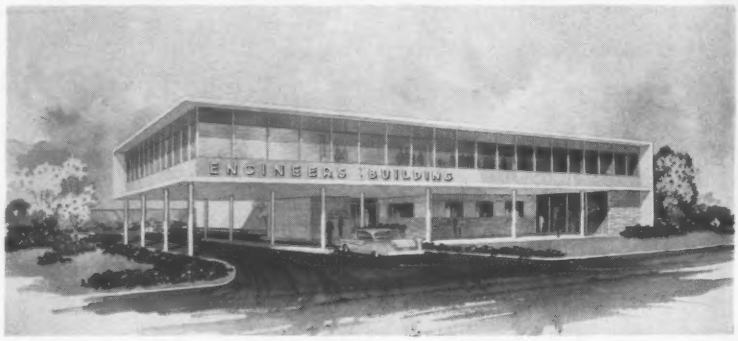
The court upheld the board on all counts. It said the board had broad discretionary powers and that its actions, where not contrary to law, were not subject to court review in the absence of fraud or collusion.

Throughout the history of the contract, Judge Harlan declared, the board had given each of the contractors adequate opportunity to seek clarification of the plans, had carefully weighed each of its decisions, had not exceeded its powers, and had acted with reasonableness and propriety in an effort to discharge its obligations to the people of Maryland.

Lummus Company Sells Its Heat Exchanger Division

Lummus Co., New York City, designer and builder of chemical and petroleum plants, sold its heat exchanger division to Yuba Consolidated Gold Fields, San Francisco, for $2 million. The transaction included a manufacturing plant at Honesdale, Pa.

Lummus officials said the manufacturing division was sold so that the company can concentrate on its design and construction activities.



Colorado Engineers Plan Society Building

Engineering leaders at Denver are pushing a plan to construct an Engineers Building to house branches of engineering, architectural and scientific organizations.

Looking to such a structure, the Colorado Society of Engineers, Inc. bought nearly one acre as the site for the structure which has an estimated cost of $250,000.

Ben D. Landes, chairman of the society's building committee, said no bids for construction would be called "until we have the money in the bank."

Plans for the building shown above have been drawn by Paul R. Reddy, Denver architect.

Two types of financing are under study. One calls for the issuance of long-term, low interest-bearing obligations to be bought by individual members of organizations occupying the building. The other would authorize leasing of wall space for advertising in the two major rooms of the building.

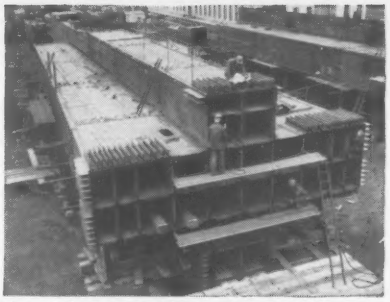
In the two rooms, an auditorium and a plans and specifications room, 1,000 sq ft of eye-level wall space is available. Space would be leased for three years at $450 a sq ft. Advertisers would be limited to a maximum of 2 sq ft in any one location but could lease additional space in other areas.

Advertising will be limited to materials manufacturers, equipment manufacturers, supply houses, contractors, engineering firms and others providing goods or services used by engineers, architects and scientists.

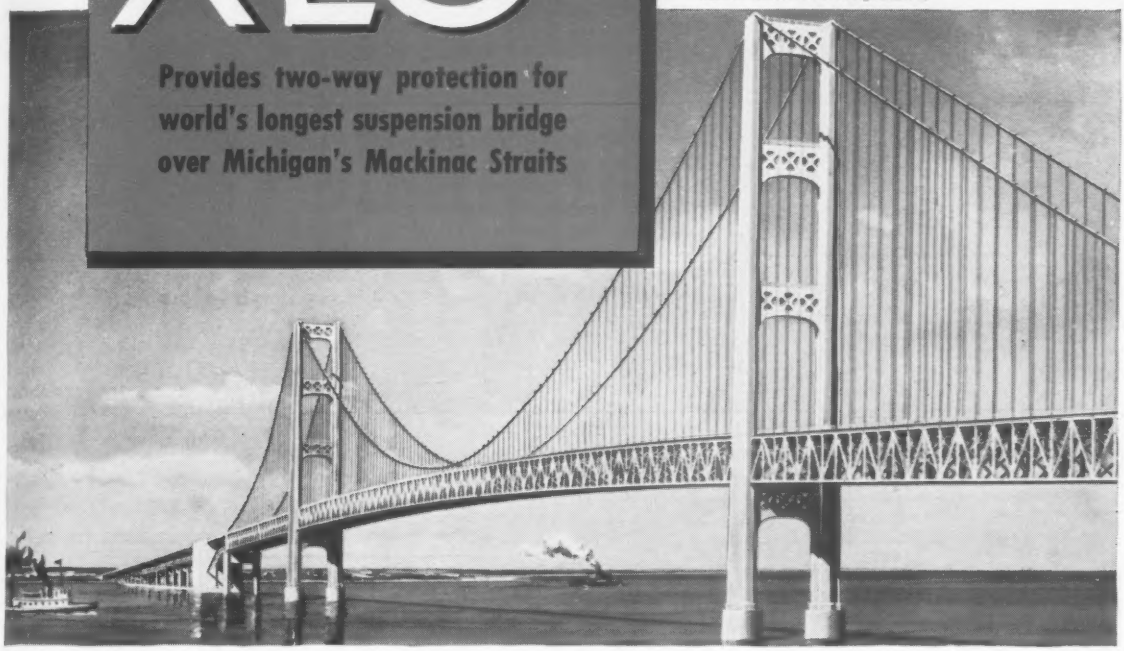
(*B & F continued on page 108*)

Pittsburgh's X-L-O STRUCTURAL STEEL PRIMER

Provides two-way protection for world's longest suspension bridge over Michigan's Mackinac Straits



One of the tower sections being assembled at Ambridge Plant of the American Bridge Division, United States Steel Corporation.



1. Safeguards steel shapes against corrosion during transit and erection

2. Makes an excellent foundation for field painting

A **70-YEAR** dream come true! That's the new five-mile bridge now being erected to link Michigan's upper and lower peninsulas. This huge project was designed by Dr. D. B. Steinman. The American Bridge Division, United States Steel Corporation, is fabricating the 75,000 tons of structural steel for its superstructure and major portions of the foundation caissons and cofferdams.

This giant project features a suspension bridge with a center span of 3,800 feet, two 1,800-foot side spans, and two 472-foot unloaded backstay spans. Total length, including anchorages, is 8,614 feet, making it the world's longest suspension bridge.

Structural shapes for this viaduct are shopcoated with Pittsburgh's X-L-O Primer to protect them against corrosion during storage, transit and erection. This remarkable finish eliminates need of costly metal cleaning. Its remarkable wetting characteristics assure uniform coverage even over surface irregularities caused by mill scale. Satisfactory through drying of film within twenty-four hours, regardless of weather, makes possible prompt shipment to job sites.

X-L-O Primer also serves as an excellent foundation for final coats. Pittsburgh's IRONHIDE and METALHIDE, in suitable colors, are available for field coating.

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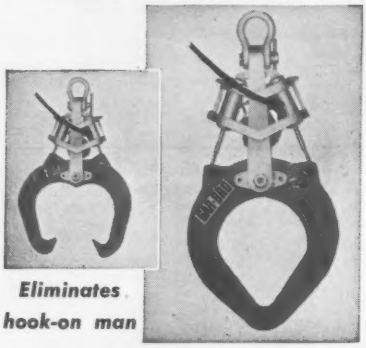

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FHA Cuts Downpayments

Homebuilding got the hoped-for boost from government this week. The Federal Housing Administration eased downpayments for home buyers and raised the allowable interest rate on FHA-insured mortgages, at the same time setting liberal discount limits that will further assist the financing of these home loans.

Downpayment requirements were lowered to the minimums permitted by the new housing law, as shown in the table.

Interest rates go to 5¼% from the current 5%. The idea is to try to lure money into the mortgage market.

The effect on new housing starts is not going to be dramatic in the remainder of 1957, but the Administration's decision was hailed by the homebuilding industry because it comes early enough for builders to work in advance on more ambitious 1958 plans.

Charles Goodyear, president of the National Association of Home Builders, told a Congressional committee a week ago that he expects starts this year to be a low 850,000 or so—regardless of where downpayments are pegged. Some others in the industry, however, are more optimistic than Mr. Goodyear. They think the action will touch off a mild upturn in the remainder of this year and starts will at least get over the 900,000 mark.

For a month, ever since President Eisenhower signed the bill authorizing—but not requiring—the lower downpayments, Washington had heard speculation that the Administration would not invoke them because of fear of feeding inflation.

The since-retired Treasury Sec. George M. Humphrey, Federal Reserve Chairman William McChesney Martin and most of President Eisenhower's top economic advisers were portrayed as being against lower downpayments at this time. Only the federal housing chief, Albert Cole, and the FHA Commissioner, Norman P. Mason, were said to be making a plea for using the lower downpayments now.

Then how did it happen? No one outside the Administration is absolutely certain, but the most prevalent view is that the White House felt, once the higher interest rates had been determined as necessary, it should "do something for the people as well as the lenders."

As a further aid to financing, the new rules established permissible discounting of FHA mortgages on a regional basis, with a maximum of 2½% allowed in the areas where money is hardest to get—as in the mountain states.

—FHA Downpayments—

FHA appraisal	Old amt.	New amt.
$6,000	$ 300	$ 180
7,000	350	210
8,000	400	240
9,000	450	270
10,000	700	300
11,000	950	450
12,000	1,200	600
13,000	1,450	750
14,000	1,700	900
15,000	1,950	1,050
16,000	2,200	1,200
17,000	2,450	1,500
18,000	2,700	1,800
19,000	2,950	2,100
20,000	3,200	2,400
21,000	3,450	2,700
22,000	3,700	3,000
23,000	3,950	3,300
24,000	4,200	4,000
25,000	5,000	5,000

Cement Outlook

Some price boosts due; two producers hold line

Settlement of the cement strike last week and resumption of shipments to construction sites (ENR, Aug. 1, p. 17), brought a flurry of price announcements from producers.

Ideal Cement Co., Denver, was among the first officially to announce a price increase, but did not disclose by what amount. Medusa Portland Cement Co., Cleveland, followed with a prediction that cement prices would be raised, but added the increase probably would be held off until November or December in those areas where "we are the dominant shipper." Ideal had announced the increase for the fall.

On the other side of the fence, Arizona Portland Cement Co. at Rillito, announced a 15 cent per barrel mill price reduction.

Alpha Portland Cement Co., Easton, Pa., also was inclined the same way. J. F. McGee, chairman, said the company feels "the inflationary trend should be curbed." So, in spite of increased operating costs and higher wages, Mr. McGee said that Alpha intends "to hold the line on prices at least for the remainder of this year."

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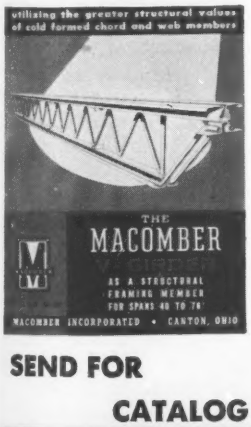
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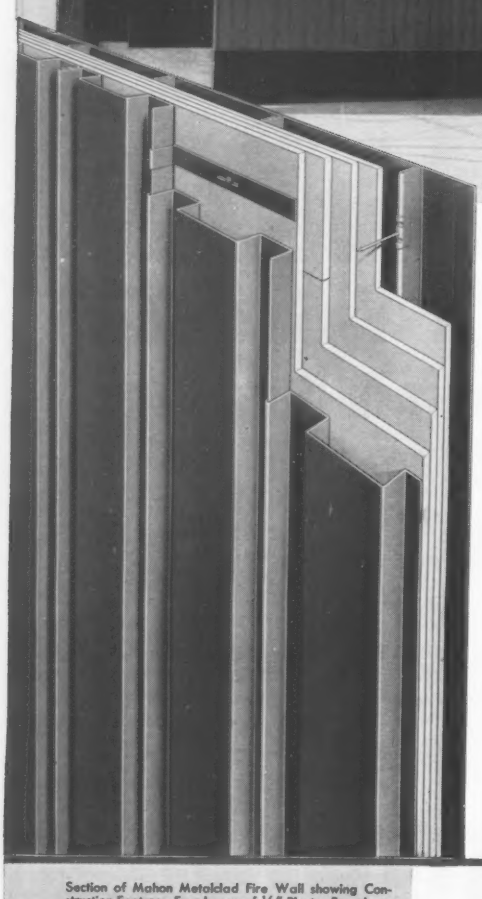

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Mahon Underwriters' Rated Metalclad Fire Walls are now available for use as interior dividing fire walls or as exterior curtain-type fire walls. They can be installed in old or new buildings, of either steel or reinforced concrete construction, where a fire hazard may exist, or where the requirements of Fire Insurance Underwriters or Building Codes must be met. The Mahon Metalclad Fire Wall is field constructed. It has been tested by the Underwriters' Laboratories, Inc., and has been given a Two-Hour Rating for use as either an interior or exterior fire wall. When employed as an exterior wall, Fiberglas insulation can be inserted between the interlocking ribs of the inner wall plates, thus providing insulating properties superior to that of a conventional masonry wall with furred lath and plaster. Exterior Wall Plates may be Aluminum, Stainless Steel or Enamel Coated Cold Rolled Steel. The important feature of the Mahon Fire Wall is the Impaling Clip with its Stainless Steel Spike (Patents Pending) which permits construction of the wall with only .0048 sq. in. of through-metal per sq. ft. of wall area. Mahon engineers will cooperate fully in supplying information and assistance in adapting this product to your particular requirement.

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Section of Mahon Metalclad Fire Wall showing Construction Features. Four layers of ½" Plaster Board are sandwiched between Roll-Formed Steel Wall Plates. All Joints in both Wall Plates and Plaster Board are Offset.

MAHON

Investigators Draw New Bead on Hoffa

Effort to link teamster leader with New York rackets poses new problems for AFL-CIO and building trades

Still irked by the bribery acquittal of teamster leader James R. Hoffa, the Senate Select Committee last week fired a broadside at union activities in New York City in what looked like an effort to scalp Mr. Hoffa and to spike his chances of succeeding Dave Beck as teamster president.

The investigation, which adds immeasurably to the internal dilemmas of the AFL-CIO and its Building Trades Department, was described by committee chairman Senator McClellan as an attempt to show that "hoodlums and racketeers" had penetrated the "labor picture" with the aid of "certain high level union officials," among them Mr. Hoffa. One of the professed targets is the possible role played by Mr. Hoffa and Johnny Dio in the affairs of the teamsters' influential Joint Council 16, the recent history of which has witnessed formation of several "paper" locals (ENR May 17, 1956, p. 186) and the unseating of president Martin T. Lacey by John O'Rourke.

The 44-year-old Mr. Hoffa, long considered heir to Mr. Beck, announced in San Francisco that the New York investigation would not affect his bid for the union presidency. He claims support of 75% of the teamsters' membership, including those in the Eastern, Central and Southern Conferences.

• **Squeeze**—The big dilemma for the building trades is apt to shape up in Atlantic City this week when the AFL-CIO Building and Construction Trades Department meets in special convention to consider changes in its constitution. Rumored to take precedence over all agenda items is the jurisdictional conflict between craft and industrial unions, with Mr. Hoffa leading the protest against AFL-CIO President George Meany's roving-team plan for settling jurisdictional disputes (ENR July 11, p. 145). The plan, which carries no jurisdictional guarantees, is considered by many to leave the building trades still in the position of paying too high a price for labor unity as pressure mounts for completion of AFL-CIO mergers on the state level.

Acceptance of Mr. Hoffa's leadership in that fight would drive a deeper wedge between the building trades and the AFL-CIO, in which the recent use of the Fifth Amendment by carpenters' President Maurice Hutcheson is still an unknown quantity.

James R. Hoffa

So far, neither the AFL-CIO nor the building trades has taken an official stand on the short, tough, self-confident, dynamic Mr. Hoffa. Present indications, even if the McClellan charges are not substantiated, are, as Sen. Irving Ives predicted, that Mr. Hoffa's troubles are "far from over," and that his election as teamster president would sharpen the pending threat of the teamsters' ouster from the AFL-CIO. Under those circumstances, continued membership in the Building Trades Department of 1,720,000-member union, which holds a strategic place in the construction industry, could well torpedo the AFL-CIO merger itself.

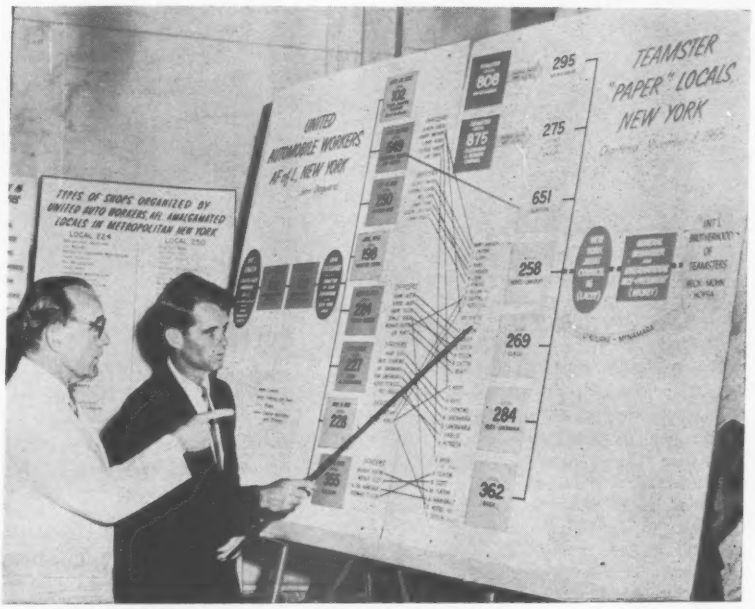
• **Record**—No defection from the AFL-CIO or labor unity has been shown by the building trades, the teamsters, or Mr. Hoffa. All have expressed the hope of solving the problems within the present framework.

Moving in that direction last week, Mr. Hoffa, whose rivalry with Walter Reuther is a significant background factor, worked with the union's constitutional committee on teamster charter changes.

He proposed that:

• The union's president be stripped of personal power and made an administrative officer under the Executive Board.

• Restrictions be placed on use of



COMMITTEE CHAIRMAN Sen. McClellan and chief counsel Robert Kennedy use chart to explain their charge that Mr. Hoffa used racketeers in his quest for union power.

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union funds to protect the interests and welfare of the rank-and-file.

• Emphasis be placed on strengthening the union and increasing its membership.

In the overall picture, in addition to the still unproved charges of the McClellan committee, these time-bombs, however, remained:

• The teamsters last week refused to appear for an AFL-CIO Ethical Practices Committee hearing on charges of corruption in the union. The reason: Unprepared.

• Mr. Hoffa reported he has been subpoenaed to appear Aug. 13 before the McClellan committee, which has scored heavy use of the Fifth Amendment.

• Hoffa backers in the teamsters union promise to continue the fight against the AFL-CIO Ethical Practice Code that denies invokers of the Fifth Amendment the right to hold union office.

Behind these lurk the ever-present possibility that the wrong moves by organized labor will produce legislation designed to hamstring still further all unions in their right to organize, to impose union shop conditions, to engage in strikes and boycotts and to indulge in political action.

New Long-Term Pacts

Agreements reached with L.A. hod carriers and New York boilermakers

Another five year contract in the construction industry last week ended a 30 day strike of 4,000 hod carriers in California's Los Angeles and Orange Counties, and paved the way for 8,000 plasterers and lathers, idled by the strike, to return to their jobs. But 8,000 plumbers and 5,000 sheet metal workers within the area remained on strike as negotiations continued.

The hod carriers' contract, first in the local industry to tie future pay boosts to cost-of-living increases, grants an immediate hourly wage hike of 16¼ cents, with another 6¼ cents next year; 2½ cents of the present health and welfare contribution will be transferred to the basic rate this year, and on May 1, 1958, the health and welfare payment will be increased 10 cents. During the last three years, pay boosts will be geared to the Bureau of Labor Statistics' cost-of-living index. The contract prohibits contractors from transferring more than 10% of their crews from one local's jurisdiction to another.

Side effect of the contract is to give members of the plasterers union a 1¼ cent pay boost this year and next. Union had settled earlier for 15 cents now and 5 cents next year.

Meanwhile, New York City boilermakers, who had refrained from striking during negotiations, added another three year contract to those already signed in the metropolitan area. Representing a somewhat better bargain than other unions got under the earlier pattern of 65 cents over three years, the contract grants a 75 cent wage boost in six installments—15, 10, 15, 10, 15, 10—plus a 10 cent pension fund contribution effective as of July 1. Hourly rate after the final installment will be $4.75.

Union Work Permits

Court orders carpenters to cease charging fees

Three district councils of carpenters and two local carpenter unions in Southern California have been ordered by the United States Ninth Circuit Court of Appeals to stop their practice of charging nonunion members fees for temporary working permits. The order became effective July 26.

The court upheld a National Labor Relations Board claim that the practice is unfair and discriminatory under the Taft-Hartley Act.

Directed against the Los Angeles, San Bernadino and Riverside District Councils of Carpenters and Locals 1400 and 1046, the order directs the unions to cease and desist from "causing or attempting to cause Pardee Construction Co. or any other employer over whom the NLRB has jurisdiction to discriminate against employees or applicants for employment by conditioning the eligibility of such employees or applicants to register for work or receive work orders, under a contractually established, exclusive employment referral system, upon the payment of a fee for a temporary working card which members of local unions affiliated with the District Council of Carpenters are not required to pay."

An NLRB spokesman in Los Angeles said he believes other unions have engaged in the practice of charging discriminatory fees to nonunion members and that the practice has existed "for a number of years" among some Southern California unions that maintain hiring halls.

Except for discouraging imposition of the special fee, no significant changes are anticipated in hiring hall practices as a result of the court ruling. Unions maintaining hiring halls will still be obliged to send non-members to employers in open competition.

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The two components are pumped from the vats with air pressure through the hoses and are mixed and proportioned in Allied's patented extrusion nozzle (5). This special nozzle applies the seal positively and neatly in the joint. The free swinging boom (6) keeps the hoses free and makes the application of the sealing compound a one-man operation with this equipment.

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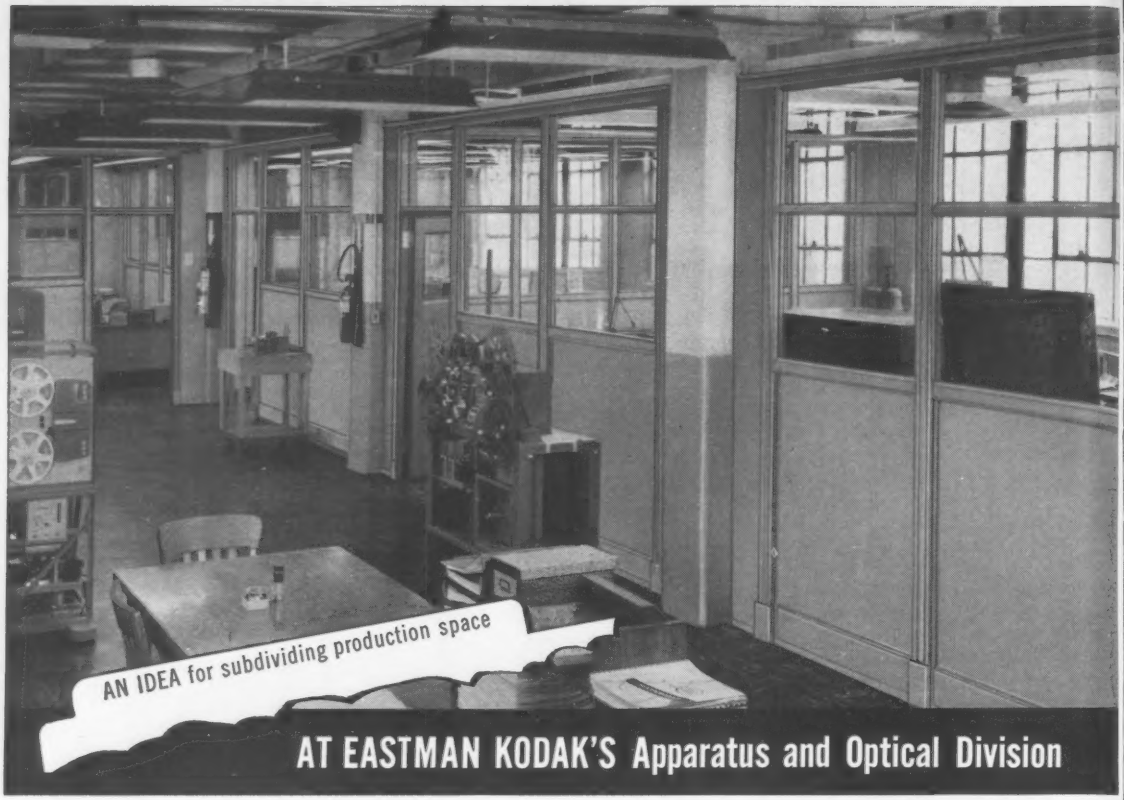

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HAUSERMAN INTERIORS

Right-to-Work Law Used By Union as a Defense

A building trades union last month successfully used the Tennessee right-to-work law to get out from under an $18,000 damage suit filed by a contractor who claimed a contract had been lost because of a strike by the union.

The suit was filed by Finchum Steel Erection Company of Knoxville. The firm had a contract to erect structural steel for a Rohm & Haas plastics plant and the contract required use of union labor. A dispute between Finchum and a member of iron workers' Local 384 led to a union walkout that was said to have prevented Finchum from performing the contract. Result was cancellation of the contract by Rohm & Haas. Finchum sued the union for damages.

The union contended that the union shop clause in the contract made the latter void under the state's right-to-work law and that the damage suit, having nothing to support it, must also fall by the wayside. Circuit Judge John Kelly agreed, but noted the union's anomalous position in these terms: "The union theory presents a most unusual anamoly, a defendant union and its officers deviating from union labor's ancient and well-known opposition to right-to-work laws and invoking one of those laws to defend itself against a threatened liability."

Big Four Makes Progress In Florida Organization

Union efforts to organize Florida's heavy construction industry are gaining momentum as the AFL-CIO and the building trades' "big four" train their guns on Cone Brothers Contracting Co., of Tampa—one of the largest construction firms in the state.

The membership drive has been in the works for many months and is spearheaded by the teamsters, operating engineers, carpenters and laborers.

No fly-by-night campaign, the strategy meeting for the Cone operation was attended by 40 union leaders on the national level, including John W. Livingston, director of organization for the AFL-CIO.

J. W. Hughes, president of teamsters' Local 79 in Tampa, said that Cone workers "already have been organized" and the next move will be contract negotiations with the company. He quoted Mr. Livingston as saying that "Cone Brothers employees will have complete moral and financial support of the entire labor movement."

According to union leaders, the organizational drive has included the firm's roadbuilding operations. Its Tampa sand and material company, a materials operation in St. Petersburg and concrete and asphalt plants about the state. Some 1,100 employees are involved.

Following the Big Four's failure to organize through the Associated General Contractors' district chapters in the state, present strategy appears to be to single out the larger contractors as targets one at a time. First to be hit with a strike was B. B. McCormick & Sons, Inc., of Jacksonville Beach, a prime contractor at the Cape Canaveral Guided Missile Base.

Operating Engineers Help Apprenticeship Promotion

Union operating engineers in Arizona have agreed to help finance an apprenticeship program designed to meet the manpower needs generated by the federal highway program.

According to W. A. Gray, business manager of the Phoenix local, 400 union members throughout the state have authorized deduction of one per cent an hour from their hourly pay, provided their contractors put a matching sum in the apprenticeship fund.

Of the building trades unions, the operating engineers have been one of the least active in the nation's registered apprenticeship programs. Compared with the painters union, which has a comparable number of members, for example, the operating engineers had only 394 registered apprentices as of July 1, 1956, the painters 4,497. Because of the Davis-Bacon provision in the Federal-Aid Highway Act of 1956, apprentices cannot be employed as such on federally assisted highway construction unless enrolled in a registered program.

Industry and Labor Urged To Help Fight Inflation

AFL-CIO President George Meany last month urged management and labor to exercise "common sense and self-restraint" in a cooperative effort to halt inflation.

Mr. Meany's remarks were made amid mounting public interest in the relationship of wages, prices and profits to inflation. The AFL-CIO has taken the position that price increases by steel and their industries are not justified by increased labor costs that could have been absorbed, and that blaming labor for price increases is "propaganda rather than economic reality."

Speaking at a union-industry meeting in Chicago, Mr. Meany warned that

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inflation represents a "real threat to our way of life."

Management and labor, he said, have a responsibility each to the other. "Labor cannot make progress at the expense of the rest of our economy," he declared, "and neither can business."

Most of the AFL-CIO efforts to have the public informed of the facts at issue through a Congressional investigation have been spearheaded by Walter Reuther, chairman of the federation's economic policy committee and head of the United Auto Workers Union. Mr. Reuther contends that the inflation has been "artificially rigged" by a few dominant corporations, that interest and dividend income have outstripped wage increases by 11 to 28% during the last four years, and that industrial price increases have in many cases occurred in the face of record profits and of less-than-capacity operation.

Labor Briefs . . .

• **Higher rates**—Unemployment insurance tax rates in New York have reached their highest level since 1953 because of a 0.3% subsidiary payroll contribution required by law. As in previous years, highest average tax rates are in the construction and apparel industries—2.61 and 2.60% respectively.

• **Employment statistics**—A statistical summary showing the number of employees in each state working in nonagricultural industries, including contract construction, during each month in the period 1939-56 has been prepared by the U. S. Bureau of Labor Statistics. Study is entitled, "State Employment 1939-56."

• **Penalized**—Five contractors are among 48 New York employers convicted of misdemeanors during the first six months of 1957 for repeated failure to file unemployment insurance payroll reports on time. Total fines were $2,100; penalties ranged from $15 to $175, some with alternate jail sentences.

• **Strike averted**—Fear of a province-wide strike by British Columbia's 4,500 lower mainland carpenters dissolved last month when the union accepted a new two year contract granting a 43 cent hourly wage boost. Retroactive to April 1, the agreement will increase the hourly rate in three installments from $2.25 to $2.68.

• **Work stoppages**—Projects affected by work stoppages over working conditions and wage rate disputes last month included the giant Bowaters Carolina pulp paper plant near Rock Hill, S. C., and the million-dollar flood control dam at Wrightsville, Vt.

OFFICIAL PROPOSALS

APPEAR HERE EACH THURSDAY. PROPOSAL ADVERTISEMENTS ACCEPTED UP TO 10:30 A.M. FRIDAY FOR THE ISSUE DATED THE FOLLOWING THURSDAY.

Bids: September 28, 1957

Board of Management for the Port of Rangoon Development of Rangoon Port

CIVIL ENGINEERING CONTRACT NO. 2
Comprising
TRANSIT SHEDS,
WAREHOUSES AND WORKSHOPS

The Board of Management for the Port of Rangoon invite Civil Engineering Contractors to tender for Contract No. 2 for the Development of the Port of Rangoon.

The work involved in this Contract includes the complete provision and erection in structural steel, with concrete floors and brickwork of three Transit Sheds, part double storeyed, each approximately 450 feet long by 200 feet wide; one double storeyed Warehouse approximately 293 feet long by 100 feet wide; one single storey Crane Maintenance Shop 320 feet long by 130 feet wide; and one single storey Warehouse 210 feet long by 150 feet wide.

These buildings are to be erected on and behind Sule Pagoda Wharves Nos. 5, 6 and 7, now under construction by separate contract. Tenders will be considered only from Contractors of established reputation in building and civil engineering, and the Structural Steelwork is required to be supplied by approved specialist firms in structural steelwork. The structural steelwork section may be undertaken either by the main contractor or by a nominated subcontractor within the main contract. Brief particulars of experience and the financial standing of the Contractors should accompany the application.

The Contractor whose tender is accepted may be required to furnish a security as specified in the Tender Documents.

The closing date for tenders which are to be addressed to The Chairman to the Board of Management for the Port of Rangoon, P.O. Box No. 1, Rangoon, will be 12.0 noon on Saturday 28th September, 1957. Tenders will be invited on the basis of a priced Bill of Quantities.

Applications for formal Tender Documents from bona fide firms of Contractors who intend to tender for the work should be made to the office of the Chairman in Rangoon or to the Board's Consulting Engineers, Sir Alexander Gibb & Partners, Queen Anne's Lodge, Westminster, London, S.W.1., as soon as convenient. The Tender Documents will be despatched to tenderers early in August. A deposit of £100 Sterling or K.1300 per set will be required from each Contractor who makes application for the Tender Documents. Additional sets may be obtained on payment of further deposits as above. Deposits will be refunded only following the submission of a bona fide tender by the Contractor and the return of the Tender Drawings and Documents in good condition.

U Win Pe. Chairman.

DEPARTMENT OF HIGHWAYS, MONTPELIER, VERMONT. NOTICE TO CONTRACTORS. Sealed proposals will be received by the department at the State Office Building until 11:00 o'clock A.M. Eastern Daylight Saving Time (10:00 o'clock A.M. Eastern Standard Time) on Friday, August 23, 1957, for the construction of the following project: GUILFORD-BRATTLEBORO I 001-1 (6): In the Towns of Guilford-Brattleboro; the Bernardston, Massachusetts-Brattleboro, Vermont road; beginning approximately 5.879 miles northerly of the Massachusetts-Vermont State Line and extending northerly 1.942 miles. Type of construction being grading, drainage, sub-base with a bituminous concrete surface course; two 3-span steel I-beam structures with a concrete floor and two 2-span steel I-beam structures with a concrete floor. Complete information at said office; plans on display at the office of R. O. Munn, District Highway Engineer; Brattleboro, Vermont; minimum wage rates predetermined by the Secretary of Labor for the project are set out in the advertised specifications and bid proposal, and such rates are a part of the contract covering the project. Minimum truck rates have been predetermined by the State Highway Board and are set out in the bid proposal. Contractors bidding on construction involving over $25,000.00 must be prequalified in accordance with Department Regulations. Right is reserved to reject any or all bids and waive any or all technicalities. William Poeter, Commissioner of Highways. Montpelier, Vermont. July 25, 1957.

Board of Education— Bureau of Construction

Prequalification Date: August 15, 1957.
Notice Re: Prequalification Forms for Contractors
APPROVED AS TO FORM
Acting Corp. Counsel

NOTICE IS HEREBY GIVEN THAT
The Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, L. I. C., New York, will receive applications for prequalification of bidders from Contractors whom may wish to submit bids for the proposed hereinafter specified contracts as follows:
General Construction
Pulmbing & Drainage
Heating & Ventilating
Electrical Work and
Lighting Fixtures.
Borough of Brooklyn
J.H.S. 142, Addition and Modernization
Henry, Rapelyea and Coles Streets.
Borough of the Bronx
J.H.S. 38, Addition and Modernization
St. Ann's Avenue and Rae Street.,
Pre-qualification application forms will have to be secured from and must be submitted to the Superintendent of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, N. Y.
Bids when advertised will be received from prequalified bidders only.
Time for submitting prequalification applications by contractors will expire on Thursday, August 15, 1957.
WILLIAM H. CORREALE
Superintendent of School Buildings
Design and Construction
Dated: July 31, 1957

Bids: October 14, 1957

Government of Iraq Electrification of Basrah Power Project Contract No. (3) Transformers, Switchgear and Accessories

The Development Board and Ministry of Development of the Government of Iraq invite tenders from qualified firms for the supply and delivery, erection and supervision of operation, of Transformers, Switchgear and Accessories for Basrah Power Station.

Full information regarding this tender can be obtained on and after July 22, 1957 from Embassy of Iraq, Washington, or Messrs. Ewbank and Partners, 10/11 Grosvenor Place, London S.W.1., England.

All Tender Documents are to be submitted in English to the Ministry of Development, on or before 12 noon, local time on October 14, 1957.

Minister of Development.

OFFICIAL PROPOSALS

Bids: August 29, 1957

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 29th day of August, 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 353 Broadway, Albany, N. Y.						
Albany (Rte. 43)	R.C. 57-142	Normanskill Viaduct, S.H. 9109	0.22	Reconstruction of Viaduct Abutments, Pier, Sidewalks, Curbs and Expansion Joints	$2,500 Plans $10	$45,000
Albany (Rte. 7)	FARC 57-144 FAC 57-9	Troy-Schenectady, Pt. 4, S.H. 630 City of Watervliet: 19th Street (City Line to Grotto Ct.) Project U-411(4)	2.39	Asphalt Concrete Pavement 2 @ 24' Var. Wide	80,000 Plans $15	1,225,000
Albany & Saratoga	FISH 57-16	Interstate Route 502 (Mohawk River Bridge & Approaches) (Latham to Clifton Park, Sect. 2, Cont. 2) Project I-1119(7)	0.27 (0.43 Acc.)	9" Cem. Conc. Pavt. 2 @ 36' Wide = 0.27 Mi. Asphalt Conc. = 0.43 Mi. 600' Span Hinged Steel Arch Bridge With Comp. I-Beams Approaches 213.5'	300,000 Plans $25	5,598,000
Saratoga & Washington (Rte. 29)	FARC 57-141	Schuylerville Village: North Broad and Ferry Streets, S.H. 1591 Schuylerville-Greenwich, S.H. 1437 Project F-1135 (1)	0.61	9" Cem. Conc. Pavt. Var. Wide = 0.59 Mi. Misc. Work = 0.02 Mi. Comp. I-Beam Br. 348' Cant. Girder & Comp. I-Beam Br. 531'	78,000 Plans $15	1,429,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee St., Utica, N. Y.						
FULTON (Rte. 29)	FASS 57-11	Union Mills-South (Co. Rd.) Project S-502(1)	2.26	Graded Gravel, Bit. Double Surf. Treat.	16,000 Plans $15	293,000
Fulton (Rte. 10)	FARC 57-146	Ephratah-Keeks Center, Pt. 2, Project S-472(1) S.H. 620	0.28	Asphalt Concrete Comp. I-Beam Br. 37'	7,000 Plans $10	129,000
DISTRICT No. 3, William Robinson, District Engineer, 333 E. Washington St., Syracuse, N. Y.						
Onondaga & Oswego (Rte. 11)	FARC 57-150	Cicero-Brewerton, S.H. 5249 Central Square-Union Square, S.H. 5415 Project F-463(12)	10.39	Grading, Drainage and Tree Planting	$14,000 Plans $10	$255,000
Cayuga (Rte. 38A)	FARC 57-152 R.C. 57-158	Auburn-Owasco, S.H. 614 Project F-642(2)	6.05	Asphalt Concrete, Type 1A	8,000 Plans $10	142,000
Seneca (Rte. 89	FARC 57-143 R.C. 57-149	East Varick-Canoga, S.H. 8386 Canoga-Halsey Corners, S.H. 8363 Project F-509(4)	12.53	Asphalt Concrete	32,000 Plans $10	596,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Monroe (Rte. 64)	R.C. 57-151	Pittsford Village: Monroe and South Main Streets, S.H. 5435	....	Cleaning and Painting 1 Bridge	800 Plans $10	15,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St., Buffalo, N. Y.						
Chautauqua (Rte. 60)	FARC 57-106	Sinclairville-Casadaga, Pt. 2, S.H. 1012-1012A Casadaga-Fredonia, S.H. 938 Project F-1117(1)	6.27 (1.83 Acc.)	Asphalt Conc., 6.49 Mi. 9" Cem. Conc. Pavt. 24' Wide = 1.24 Mi. Misc. Work = 0.37 Mi. Reinf. Conc. Arch Br. 68'	140,000 Plans $25	2,506,000
DISTRICT No. 8, K. G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Rockland	H.T. 57-3	New York State Thruway-Hudson Section-Sub. 8 Access Ramp to Route 59	0.26	9" Cem. Conc. Pavt. Var. Wide	4,000 Plans $10	69,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick St., Binghamton, N. Y.						
Broome & Schoharie	R.C. 57-148	Barker, S.H. 375 Howes Cave-Cobleskill, S.H. 5286	....	Cleaning & Painting 2 Thru Truss Bridges 160' and 145'	$500 Plans $10	9,000
Sullivan	FESS 57-6	Barryville-Yulan, Co. Rd. 21 Project ER-26(2)	1.86	Asphalt Conc., Opt.	13,000 Plans $15	247,000
DISTRICT No. 10, M. E. Goul, District Engineer, Little East Neck Road, Babylon, L. I., N. Y.						
Nassau (Rte. 107)	FARC 57-147	Massapequa-Glen Cove, S.H. 9017 Project U-S-377(1)	2.47 (1.29 Acc.)	9" Cem. Conc. Pavt. 2 @ 37' Var. Wide = 2.27 Mi. Asph. Conc., = 0.46 Mi. Temp. Asph. Conc. = 0.39 Mi. Misc. Work = 0.64 Mi. Bridge Widening at Northern State Parkway	125,000 Plans $50	2,273,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON

SUPT. OF PUBLIC WORKS

Read the Official Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

OFFICIAL PROPOSALS

Bids: August 30, 1957

Construction of Sewers, Laterals, Etc. Town of Wallkill, Orange County, N. Y.

NOTICE TO BIDDERS FOR CONSTRUCTION OF SEWERS, LATERALS, ETC. IN WASHINGTON HEIGHTS SANITARY SEWER DISTRICT, TOWN OF WALLKILL, ORANGE COUNTY, NEW YORK

NOTICE IS HEREBY GIVEN that sealed proposals are invited for furnishing the materials and labor necessary according to the plans and specifications for constructing a sanitary sewer system in the Washington Heights Sanitary Sewer District in the Town of Wallkill, Orange County, New York, and under a contract in the form substantially set out in said specifications.

Sealed proposals will be received by the Town Board at the office of Harry C. Carpenter, Engineer, 4 Fairlawn Avenue, Middletown, New York, at 8 o'clock in the afternoon (DST) on August 30, 1957, and will be opened and considered publicly by said Board at said time and place.

Plans, specifications and estimates of the expense, proposed contract for the execution of work, and forms of proposal can be examined at and copies secured from the District's Engineer, Harry C. Carpenter, at his office 4 Fairlawn Avenue, Middletown, New York, from and after the publication of this notice.

Plans, specifications and estimates for the work will be exhibited publicly in the office of the Town Clerk, Irving J. Gibbs, in the hamlet of Circleville, in said Town of Wallkill, from and after this date and until bids are received and opened.

Proposals must be made upon and in accordance with the form of proposal accompanying the plans and specifications, which form of proposal will contain instructions to bidders.

A deposit of $25.00 will be required for each set of plans and specifications distributed, which amount will be refunded only to those submitting formal bids if said plans and specifications are returned in good condition after bids have been received and acted upon by the Town Board.

Each proposal shall be accompanied by a certified check on a solvent bank of the State of New York, to the order of Kenneth W. Van Sciver, Supervisor, in the amount of five percent of the total amount of the bid, or a bond with sufficient sureties to be approved by the Supervisor, in the penal sum equal to said five percent, conditioned that if the proposal is accepted the successful bidder will enter into a contract for the work, and that he will execute within fifteen days from the date of the acceptance of the proposal a suitable surety bond in the sum of the amount of the contract, conditioned for the faithful prompt performance and completion of the work specified in the contract.

All deposits, except those of the successful bidder, will be returned.

Upon the acceptance of his bid, if the successful bidder fails to enter into a contract within fifteen days from the date of the acceptance of his proposal or fails to give the security prescribed in this notice within the time limitation, then the check deposited as aforesaid and the moneys standing to credit of the same, shall be forfeited to the Town as liquidated damages, or the Supervisor may enforce payment of the bond for the benefit of the Town.

The Town Board reserves the right to waive any informalities in, or to reject all bids submitted and to accept the bid of the lowest responsible formal bidder.

Dated, August 1, 1957.

Kenneth W. Van Sciver
Supervisor
William H. Hamblin
Harold F. Coddington
Hanford Terwilliger
J. Raymond Townsend
Justices of the Peace
Acting for the Town of Wallkill in behalf of Washington Heights Sanitary Sewer District.

OFFICIAL PROPOSAL

RATE: $2.10 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Section, Classified Adv. Div., P.O. Box 12, New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: August 29, 1957

Construction of Water Main Hamburg and Orchard Park, N. Y.

Notice is hereby given that sealed bids will be received in accordance with the law by the Erie County Water Authority until ten o'clock A.M. Daylight Saving Time on the twenty-ninth day of August, 1957 at the office of the Authority, 338 Ellicott Square Building, Buffalo 3, New York, for furnishing materials and performing the labor for constructing a thirty-six (36") inch diameter water transmission main in the Towns of Hamburg and Orchard Park, Erie County, New York, all in accordance with plans and specifications prepared by Buck, Seifert and Jost, Consulting Engineers, 112 East 19th Street, New York 3, New York.

Copies of the plans and specifications may be obtained either from the Erie County Water Authority or from the Consulting Engineers upon deposit of Twenty-Five ($25.00) Dollars, which sum will be refunded upon return of the plans and specifications in good condition within ten (10) days after the date on which bids are received or else the entire deposit will be forfeited.

The work to be done includes all materials and labor, tools, plant and equipment necessary for constructing, installing, testing and completing, ready for operation, approximately thirty-two thousand (32,000') feet of thirty-six (36") inch diameter water transmission main with connections to existing mains, valves, air relief and blow-off facilities, manholes and other accessories and appurtenances.

Each proposal must be accompanied by a certified check payable to the Erie County Water Authority or a bid bond to the favor of the Authority from a reliable surety company authorized to do business in the State of New York and satisfactory to the Authority, in amount equal to ten (10%) percent of the proposal. The certified check will be retained to pay for any damage or loss to the Authority, or the liability bond will accrue, in case the successful bidder shall neglect or refuse to enter into a contract in accordance with his proposal.

The Authority reserves the right to consider bids for thirty (30) days after their receipt before awarding any contract and the right is reserved to accept any bid or to reject any or all of them.

ERIE COUNTY WATER AUTHORITY
By: WILLIAM J. CARNEY
Secretary

Buck, Seifert and Jost
Consulting Engineers

Dated: July 30th, 1957

U. S. Government

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, until 10:00 A.M., October 23, 1957, and at that time publicly opened, for the work and material required to convert Gatun, Pedro Miguel and Miraflores Locks in the Panama Canal Zone from 25 cycle to 60 cycle operation. Plans and specifications are available for examination in the office of Chief, Procurement Division, Panama Canal Company, 21 West Street, New York 6, New York. Data can be obtained upon payment of $50.00 deposit which will be refunded when data is returned within 40 calendar days after bid opening. For further information contact this office, Desk No. 1, or telephone Bowling Green 9-5380, extension 56.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4949) will be received at Albuquerque, New Mexico until September 5, 1957, for furnishing labor and materials for Earthwork, Clearing and Structures, Belen Unit 5, Middle Rio Grande Project, New Mexico. Location near Belen, New Mexico. Principal items are clearing area, cleaning waterways, and constructing embankments for about 12.8 miles of waterways; 430 cu. yds. of concrete in structures; furnishing and installing 175 metal slide gates; and other work. Completion time April 1, 1958. For particulars, address Bureau of Reclamation, P. O. Box 252, Albuquerque, New Mexico, or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: August 22, 1957

Construction of the Gates-Chili-Ogden Sewer District

Sealed bids for Contract "A", the construction of Outfall and Trunk Sewers for the Gates-Chili-Ogden Sewer District, will be received by the Monroe County Sewer Agency at its office at 407 Terminal Building, 65 Broad Street, Rochester 14, New York until 11 O'clock A. M., E.D.T., on the 22nd day of August, 1957.

Bidding forms can be obtained and plans and specifications examined at the office of the Sewer Agency or the office of the Lozier Company, Engineers, 10 Gibbs Street, Rochester 4, New York.

Copies of plans and specifications may be obtained upon the payment of twenty-five dollars ($25.00) for each set, which will not be refunded.

The work consists of the construction of approximately four miles of sewers 8" to 27" in diameter with all appurtenances.

COUNTY OF MONROE
by: C. A. Bennett
Purchasing Agent

August 8, 1957

U. S. Government

Department of Commerce, Bureau of Public Roads, July 23, 1957. SEALED BIDS will be received at the office of the Regional Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., D.S.T., AUGUST 27, 1957, for Project 1G12,13, Blue Ridge Parkway, Amherst County, Virginia. Concrete Box Girder Viaduct over Otter Creek and Virginia Route 130, Concrete T-beam Bridge over Otter Creek, and other work. Aggregate length: 0.217 mile. The approximate quantities of the more important items are: 1,755 cu. yd. Concrete, 325,000 lb. Reinforcement Steel and 775 cu. yd. Stone Masonry. Minimum wage rates have been fixed as required by law. Plans, specifications and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Regional Engineer.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4948) will be received at Camp White, near Medford, Oregon, until September 10, 1957, for furnishing labor and materials for Keene Creek Dam and Green Springs Power Conduit, Rogue River Basin Project, Oregon. Location 16 miles southeast of Ashland, Oregon in Jackson County. Principal items are 280,000 cu. yds. excavation; 10,700 cu. yds. concrete; 158,000 cu. yds. embankment; and other work. The work is divided into 2 schedules. Completion time 60 days. For particulars, address Bureau of Reclamation, Box 386, Camp White, Oregon; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Department of Commerce, Bureau of Public Roads, July 23, 1957. SEALED BIDS will be received at the office of the Regional Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., D.S.T., AUGUST 22, 1957, for Project 2G4, Blue Ridge Parkway, Watauga County, North Carolina. Steel Girder Viaduct over Sims Creek, and other work. Aggregate Length: 0.144 mile. The approximate quantities of the more important items are: 1,975 cu. yd. Concrete, 217,000 lb. Reinforcement Steel and 175 tons Structural Steel. Minimum wage rates have been fixed as required by law. Plans, specifications, and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Regional Engineer.

Read the Official

Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

EMPLOYMENT OPPORTUNITIES

DISPLAYED

The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

——RATES——

UNDISPLAYED

$2.10 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.
Position Wanted ads take ½ of above rate.
Box Numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
Not subject to Agency Commission.

Send NEW ADS and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD
P. O. Box 12, N. Y. 36. August 22nd issue closes August 12th.

REPLIES (Box No.): Address to office nearest you
c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Gunite Superintendent—Wanted immediately. Middle Atlantic States. State age, experience, availability, salary desired. P-4640, Engineering News-Record.

Engineer-Gunite, wanted immediately, must know estimating, take complete charge of all gunite operations. Executive position ultimately available. P-5355, Engineering News-Record.

Wanted—Experienced Designers on Highways and Bridges. Locations Philadelphia and Harrisburg, Pa. and Columbus, Ohio. Long range work program. Good opportunities to qualified applicants. Reply stating experience, availability and salary requirements. P-5553, Engineering News-Record.

Assistant City Engineer Wanted: general municipal engineering and administrative duties. Thoroughly experienced. Must be registered in Ohio. Salary $6800 per year. Write giving experience resume to Service-Safety Director, City Building, Mansfield, Ohio.

Estimators—Military & Airfield Work. Architectural, Structural, Civil, Mechanical & Electrical. Quantity Take-Off & Pricing. Overseas. Mild climate. All replies confidential. Write or call Mr. Levy, Builders Estimating Service, 120 Greenwich Street, N. Y. C.

Senior Cost Engineer familiar with the Uniform System of Accounts for Electric Utilities. Duties will consist of analyzing completed major construction projects for an Electric Utility. Experience with the Federal Power Commission or a State Public Service Commission would be desirable. Some experience with the Property Record Department of any Electric Utility would also be an asset. Indianapolis Power and Light Company, Employment Department, 1230 West Morris St., Indianapolis, Indiana.

Wanted—Experienced grading and drainage superintendent for position with expanding Michigan contractor. Paving experience would also be valuable but not essential. Write, giving full particulars and salary desired: Canonie Construction Co., South Haven, Mich.

Wanted: Civil Engineering Draftsmen for work on large Southern California irrigation and drainage project. Desert type climate. Permanent position with excellent opportunity for advancement for qualified men. Salary range $3,600 to $6000 per year, dependent on experience. All applications kept confidential. Must be citizen. Please give full details of experience and education. P-5644, Engineering News-Record.

Estimators—Experienced in Industrial Construction. Permanent positions in Southeastern States. Send resume of education and experience, references and salary requirements. P-5675, Engineering News-Record.

When Answering
BOX NUMBERS . . .

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

ARCHITECT'S OFFICE—Desires men experienced in Building Design:
SPECIFICATION WRITER
STRUCTURAL DESIGNER
STRUCTURAL DRAFTSMAN
WRITE OR CALL:
LYONS & MATHER, Architects
211 State Street, Bridgeport, Connecticut.
Attention: Ernest D. Mortenson, P.E.
FOrest 6-4335.

POSITIONS VACANT

Teaching positions open in Civil Engineering and Electrical Engineering in a growing engineering college. Salary from $5500 to $8000 for school year of nine months, depending upon training and experience. Contact Dean of Engineering, University of Nevada, Reno, Nevada.

Civil-Structural Engineer wanted. Preferable Highway Bridge experience. Work in Tucson, Arizona. P-5772, Engineering News-Record.

Civil Engineers Wanted—with experience in the fields of Highway design, structures, water distribution systems, sewers, sewage treatment, pumping stations and storm drains. Public works experience desirable but not essential. Good starting salaries, excellent working conditions; stable community, fine opportunity for advancement, Merit System increases and retirement benefits. Send resume of experience and salary desired to: Department of Public Works, Baltimore County Office Building, Towson 4, Maryland.

City Engineer and Planner, small New England city. C. E. Graduate or seven (7) years experience, Municipal experience preferred but not mandatory. Please state qualifications and salary desired in first letter. Apply, Office of Mayor, Franklin, New Hampshire.

Wanted Engineers, Draftsmen, and Layouts. One of the leading structural steel and plate fabricating companies in Florida (located in Central Florida). Ideal working conditions, air conditioned office, co-benefits, insurance, hospitalization, vacation, and holidays. P-5691, Engineering News-Record.

Sales Engineers—structural experience, to promote, estimate and negotiate sub-contracts gypsum and Creteplank roof decks. Opportunities in Pittsburgh-Cleveland area and Western New York area. Write R. G. Speed, Martin Fireproofing Corporation, Buffalo 17, New York.

Teaching—Increased enrollment requires new staff members AT instructors to associate professor level to teach Structures, Fluid Mechanics, Mechanics and Strength of Materials. Opportunities to participate in contract research. Also opportunity for advanced degree for instructors. Head Civil Engineering Department, University of Tennessee, Knoxville, Tennessee.

Excellent opportunity in Consulting Engineer's office for competent engineer experienced in design and inspection of water and sewage systems, water and sewage treatment plants, estimates, reports. State education, age, experience, salary required and when could report. Correspondence confidential. P-5747, Engineering News-Record.

Civil Engineer—$5349-$6549. Public works and utilities engineering for progressive growing, industrial city of 70,000 population. Application and brochure of city available. Write Personnel Officer, Municipal Building, Hamilton, Ohio.

Beginning Civil Engineer—Recent graduate. Mount Clemens, Michigan. Near Lake St. Clair. 20 miles Northeast of Detroit. Annual salary $5,122-$5,902. P-5509, Engineering News-Record.

CONSTRUCTION ENGINEERS

Foreign Employment

Career opportunity for graduate engineers in Saudi Arabia. Degree essential. Minimum 10 years experience supervising construction of industrial buildings, oil processing and oil handling facilities. To supervise actual construction by contract or service organization personnel involving control over construction methods, scheduling, expediting and progress; utilization of men and materials; and the inspection of workmanship for compliance with plans and specifications.

Salary commensurate with experience plus living allowance and generous all-inclusive benefits. Excellent community facilities.

Write outlining background and experience. Please include your telephone number.

Recruiting Supervisor, Box 214

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

POSITIONS VACANT

Bridge Designers and Draftsmen with experience for permanent positions. Forward full educational, employment and personal data with salary requirements. Macomber & Faber, 1824 North Fourth Street, Harrisburg, Pennsylvania.

Civil Engineers: Expanding Engineering Department of a progressive city in the Santa Clara Valley 35 miles south of San Francisco. Population 10,072 in 1952, now 26,023. Rapid growth presents opportunity for advancement. Associate C.E.: $610-$742, Graduate in C.E., 3 yrs. exp. and registration in Calif. Registration can be waived temporarily if registered in another state. Assistant C.E.: $527-$641, graduate in C.E. and at least 1 yr. exp. Forward resume of experience, education and personal background to Personnel Office, City Hall, Mountain View, Calif.

Sanitary Engineers and designers. Permanent positions. Southern Connecticut. Interesting work. Send resume of experience to P-4969, Engineering News-Record.

EMPLOYMENT AGENCY

Wanted Engineers, Designer, Draftsmen, All lines. Chemists, teachers and industrial engineers. Recent grads. Cleveland Engineering Agency, 2132 E. 9, Cleveland 15, O.

SELLING OPPORTUNITY OFFERED

Manufacturers Representative wanted for several good territories in the United States. Liberal Commissions Chinook Wind Portable Heaters & Torches. Write International Manufacturing Co. 675 Rio Grande, Littleton, Colorado.

(Continued on page 122)

OVERSEAS POSITIONS

20-MONTH CONTRACTS ON HIGHWAY & BRIDGE PROJECTS

IMMEDIATE OPENINGS FOR

SOILS ENGINEER

ROAD & BRIDGE DESIGNER

OFFICE ENGINEER, HIGHWAYS

PARTY CHIEFS

LABORATORY TECHNICIAN (Materials & Soils)

REQUIRE WELL-QUALIFIED MEN WITH UP-TO-DATE HIGHWAY EXPERIENCE, WHO SEEK A CHALLENGING POSITION. REAL OPPORTUNITY TO ADVANCE AND DEVELOP WITH A GROWING FIRM THAT IS EXPANDING BOTH ITS FOREIGN AND DOMESTIC OPERATIONS. COLLEGE PREFERRED BUT NOT ESSENTIAL. ABILITY TO TRAIN JUNIOR PERSONNEL DESIRABLE.

- EXCELLENT STARTING SALARIES
- SCHEDULED OVERTIME PAY
- USUAL OVERSEAS BONUS
- QUARTERS AND SUBSISTANCE
- MEDICAL CARE & INSURANCE
- EXTRA VACATION ALLOWANCE
- COMPLETION BONUS
- FIRST CLASS AIR TRAVEL

Must be U. S. Citizen and pass physical examination. Must be single or willing to go in bachelor status. Interviews also available in Washington, D. C., San Francisco, and Portland, Ore.

Please write fully, including current salary, to

SVERDRUP & PARCEL ENGINEERING CO.

1134 Locust St. St. Louis 1, Mo.

Highway & Bridge Engineers Designers & Draftsmen

Career opportunities for men interested in professional recognition. Excellent working conditions and employee benefits including liberal retirement program.

Openings in Charleston, West Virginia.

Air Mail Resume to R. L. SHAW, *Personnel Director*

MICHAEL BAKER, Jr., INC.

BAKER BLDG. *Consulting Engineers* ROCHESTER, PA.

DEPUTY RESIDENT ENGINEER

For a $40 million rockfill and concrete dam in Iraq. Two-year contract; approximately 3-year completion schedule. Family housing at site, but no local educational facilities for children. Fill type dam construction experience required—preferably rockfill. Must be fully capable of assuming duties of Resident Engineer as required. Position is available immediately. Excellent salary. Please send complete personal and experience record to Hugo O. Niemi, Personnel Manager.

HARZA ENGINEERING CO.

400 W. Madison St. Chicago 6, Ill.

SURVEYORS

(TOPOGRAPHIC)

Challenging opportunities for Party Chiefs and Instrument men experienced in map survey control. Experience with aerial photographs and theodolites desirable. Permanent positions: considerable travel necessary. Forward detailed resume and salary desired.

AERO SERVICE CORPORATION

Photogrammetric Engineers

210 E. Courtland St. Phila. 20, Pa.

SALES ENGINEER TRAINEE

Recent civil engineer graduate or non-graduate with highway engineering or construction experience to enter sales training program. Position requires relocating at intervals during training period. Will eventually lead to highway material sales in Tar Products Division. Write stating education, experience and salary requirements. All replies will be confidential.

KOPPERS COMPANY, INC.

Personnel Manager

108 Koppers Building—Pittsburgh 19, Pa.

Graduate Civil Engineer

Excellent opportunities with nationally recognized organization engaged in engineering service work in highway and concrete fields. Location North Carolina and also covering southern Virginia and Georgia area. Permanent position. Salary based on qualifications and experience. Car allowance and expenses. Excellent benefits and retirement program.

P-5744—Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

CONSTRUCTION SUPERVISORS

Supervisory personnel with experience in responsible supervision and inspection of concrete and earthwork construction to serve as Construction Supervisors on Dams and Flood Control projects in Pennsylvania. Engineering degree not required.

Salary open. Send resume of experience, salary requirements and references to:

P-5583, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, New York 36, N. Y.

STRUCTURAL ENGINEERS

Large architectural engineering firm in Dallas, Texas, with highly diversified practice, needs structural engineers with building design experience. Permanent positions. Write George L. Dahl Architects & Engineers, 2101 North St. Paul Street, Dallas, 1, Texas. State qualifications, experience record and minimum salary expected.

Construction Superintendent Wanted

Superintendent for Engineering type construction such as pumping stations, sewage and water treatment plants and flood control work. Steady employment for aggressive qualified man. Prefer man with engineering background. Send complete details on background and education. Only those well qualified need apply. Must be willing to move around southern states at job completion.

P-5505, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

CIVIL ENGINEER

FOUNDATIONS—BRIDGES—TUNNELS—DAMS

Unusual opportunity for a recent graduate (under 30) intending to make a career of heavy construction.

Long established, successful organization constructing multimillion dollar projects in Great Lakes and Middle Atlantic States has opening for an exceptional engineer.

Replies giving record of accomplishments and references will be acknowledged.

P-5741—Engineering News-Record
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

SALES ENGINEER

ATLANTA

We need engineer with sales ability, experienced in concrete or concrete construction to head our new District Sales Office. Long-term interesting, independent and challenging postion. Salary, expense and commission.

SIKA CHEMICAL CORPORATION
Passaic, New Jersey

CITY OF DALLAS NEEDS PLANT MAINTENANCE SUPERVISOR

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P-5737—Engineering News-Record
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P-5713—Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N. Y.

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P-5586, Engineering News-Record,
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POSITIONS WANTED
(Continued from page 119)

Professional Engineer, M. ASCE. Registered, advanced degrees. Experience in administration, engineering teaching, sanitary and public health work, construction of roads, bridges, buildings, sewers. Completing present assignment. PW-5721, Engineering News-Record.

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Supt. of Quarry. PW-5773, Engineering News-Record.

Supt. of Blasting. PW-5774, Engineering News-Record.

Supt. of Shaft Tunnel. PW-5775, Engineering News-Record.

Supt. of Heavy Rock Construction. PW-5776, Engineering News-Record.

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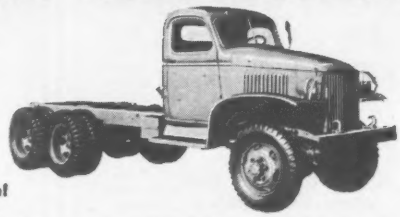

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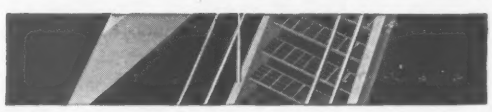


A Disaster to Learn By

OPPORTUNITIES TO INCREASE KNOWLEDGE beckon whenever disaster strikes. In the case of the Mexico City earthquake last week, the call is particularly insistent for, unlike the far more severe earthquake of a few weeks earlier in the remote mountains of Iran, this one affected one of the prideful products of modern engineering—the multi-story building.

Some of these buildings are advanced examples of a worldwide trend to lightweight curtain walls. Many include cantilevered floor slabs. Some are exceedingly slender. All are founded on a less-than-ideal soil. Foundation designs vary. So do the materials of construction.

And, with all of these special characteristics, each building was, or should have been, designed with the certainty that it would have to resist earthquake forces. Mexican engineers can make a substantial contribution to better building the world over by probing the failures and analyzing the successes shown up in their recent disaster. ENR staff editor Fred Merritt is on the scene to report their first conclusions in next week's issue.

New Light on Brittle Failures

TWO BOOKS JUST PUBLISHED do the engineering profession a valuable service by summarizing present knowledge of the brittle behavior of metals. One book was prepared by the Plasticity Committee of the Welding Research Committee; the other was sponsored by the Committee on Ship Steel, National Academy of Sciences—National Research Council. While the authors of both books admit that there still are many unanswered questions on brittle behavior—particularly how failures are triggered—they nevertheless are able to offer many valuable suggestions for avoiding brittle failure (see p. 67).

The books are based on the results of recent research, but the investigations were stimulated by the wartime welded ship failures, which offered the puzzle of occurring under very low stress conditions.

Brittle failure occurs when a material lacks the ability to absorb energy. And unfortunately, no single test can quantitatively evaluate the ductility or brittleness of a large section of a material. A steel that shows satisfactory ductibility in a conventional tensile test may fail in a brittle manner in service under very low stress. A crack, once started, may travel through the material at a speed of up to 6,000 fps, with no change in loading.

Researchers, however, have learned, the books report, that brittle behavior depends not only on the material but on the temperature, deformation velocity and state of stress. They have found that, below a critical temperature, failures will not be of the ductile type. Also that brittle cracks can travel at high speeds through steel because the energy required to propogate them is only about 1 ft-lb per sq in. of fractured surface, which can easily be supplied by the latent elastic energy of the structure.

The authors also refute two widely held concepts: (1) that brittle fracture in steel results only from impact loading, and (2) that use of a material with high notch toughness is sufficient to prevent brittle failure. While notch toughness is significant, the authors emphasize the importance of designing and fabricating structures in such a manner that notch effects and high local stress concentrations are avoided. Their most important admonition, however, is to design details so as to prevent initiation and propagation of cracks.

After reading these books, it is easier to understand how the welded plate-girder Duplessis Bridge at Three Rivers, Que., could have failed suddenly with virtually no load on it (ENR Feb. 8, 1951, p. 23): Cracks had been found in the steel prior to the failure; the temperature at the time of collapse was reported to be —30F; and the steel used had low notch toughness. Furthermore, nearly 20 other welded continuous girder bridges made of a different grade of steel are still performing satisfactorily in Quebec, ruling out the likelihood of the failure having been directly caused by volume changes in the concrete deck, as some engineers have claimed.

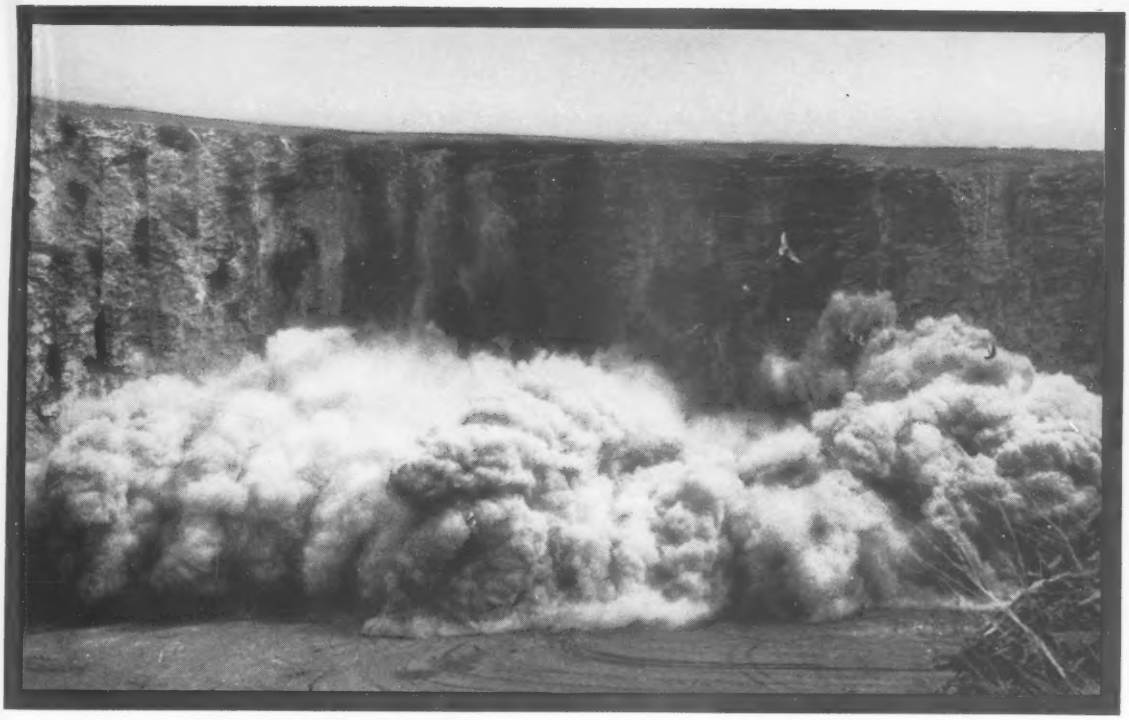
These books—Control of Steel Construction to Avoid Brittle Failure and Brittle Behavior of Engineering Structures—deserve careful study by all engineers. If the information they contain is put to good use, brittle failures need never occur.

Metric Equivalents

AT THE CLOSING SESSION of one of the international engineering conferences held in Europe this summer, an idea was advanced which warrants the careful attention of engineers in English speaking countries. Noting that English is steadily being more widely recognized as an international language of science and engineering, it was suggested that those who write in English for an international audience use the metric system as a reasonable quid pro quo.

There was no thought of urging that the English-speaking world adopt the metric system, but merely that technical and scientific papers in English, which are to have international circulation, might recognize the metric system. One simple way of doing this would be to include in all such papers the metric equivalents of all figures given in English units, by adding them appropriately in parenthesis.

This would be a small thing in itself, involving but little extra work. Both as a gesture of international goodwill, and for its intrinsic usefulness, the suggestion of using metric equivalents in papers that are to be read overseas is an appealing one. It should be adopted whenever possible.



The "BIG SHOT"
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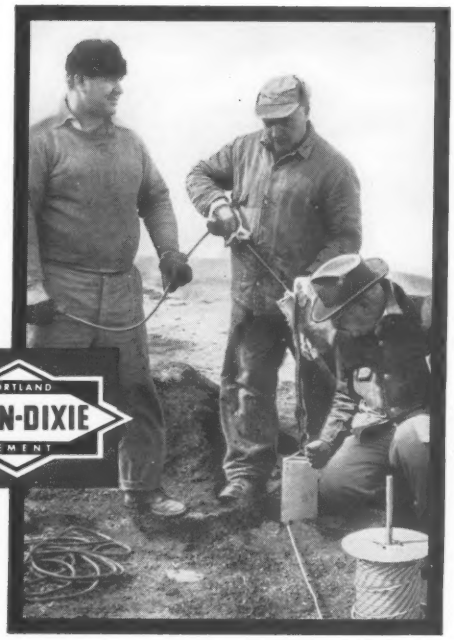

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